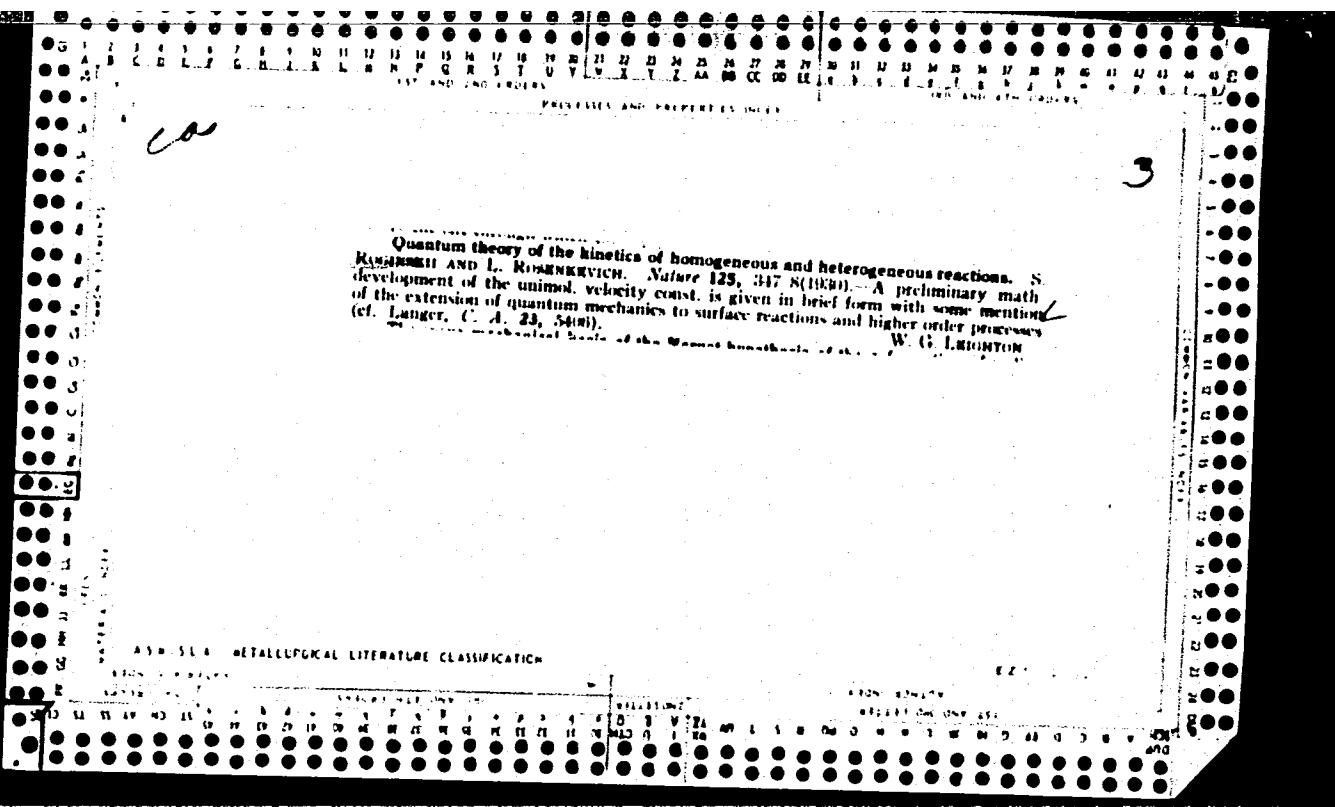
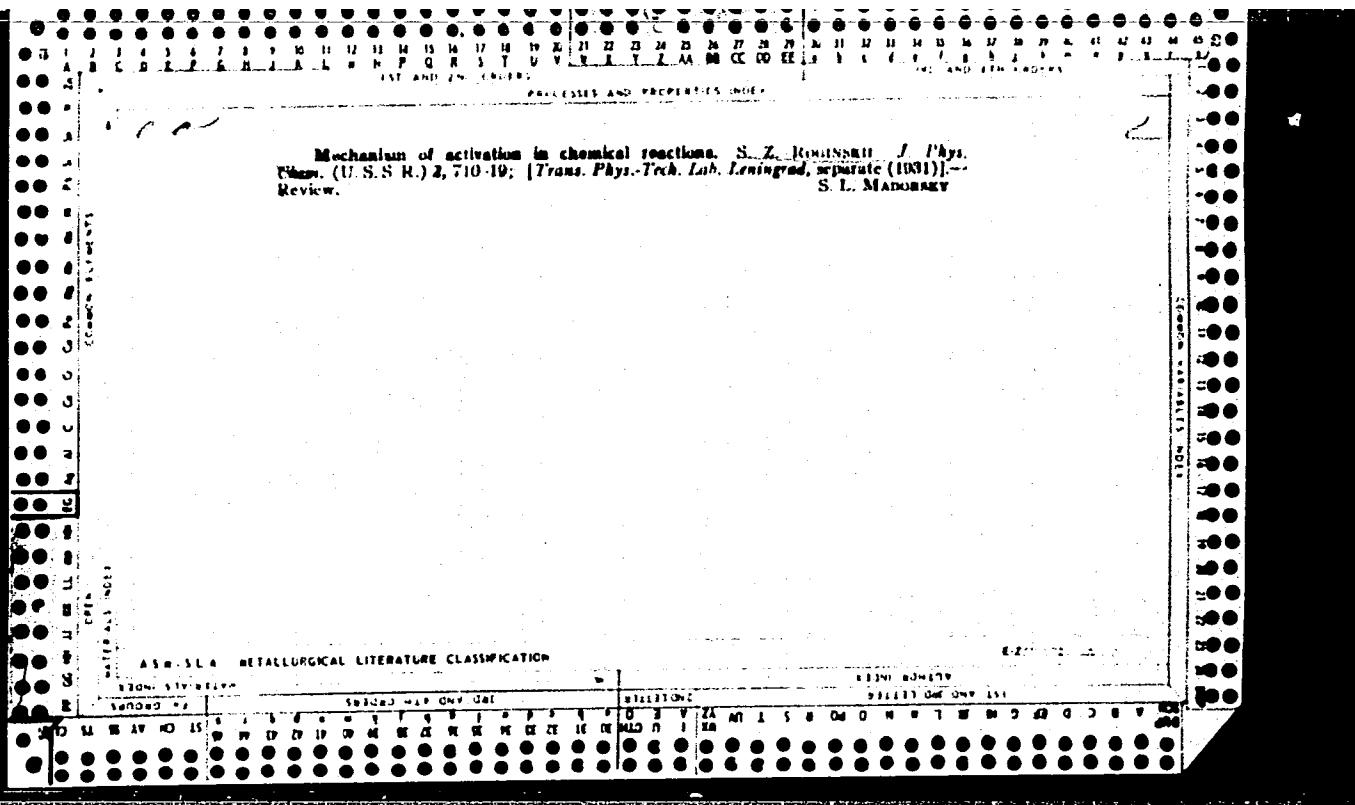


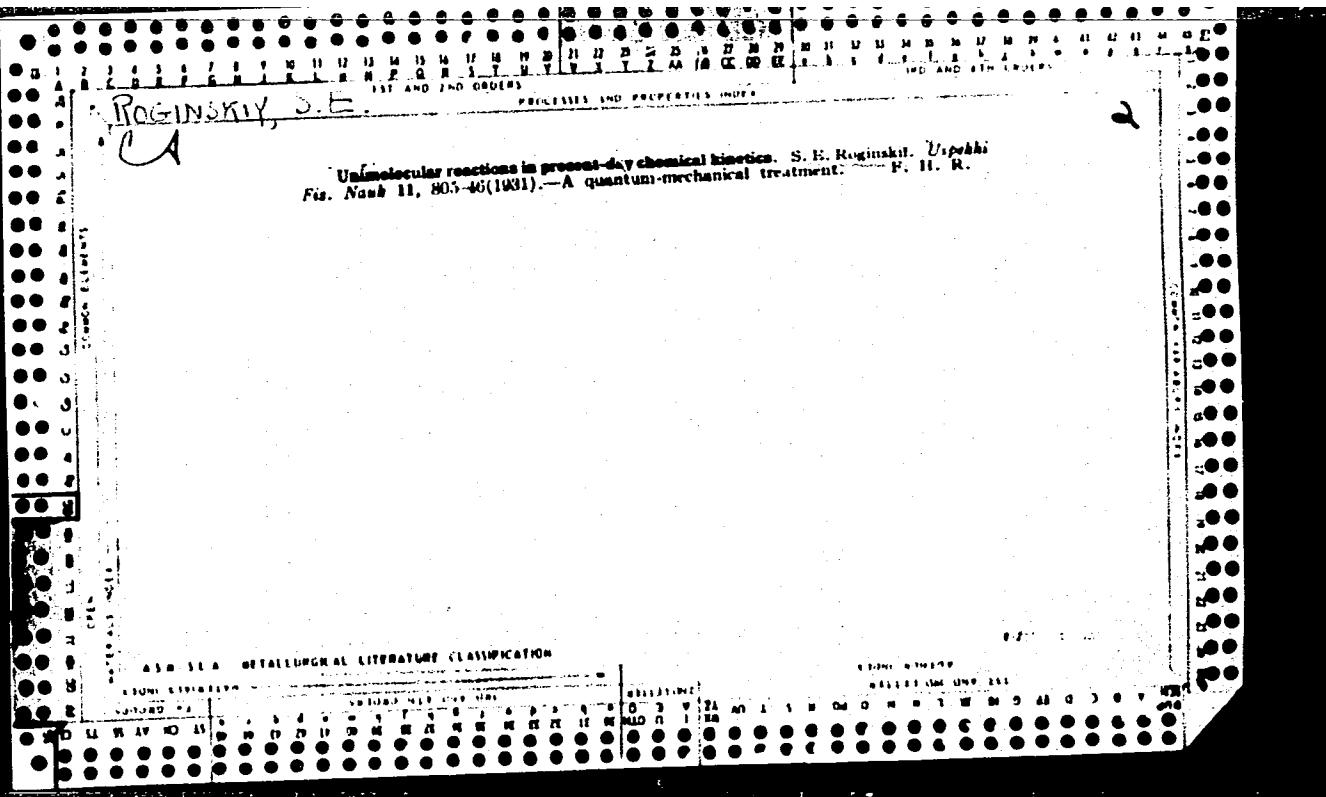
CO 2

Catalysis in the solid state. Catalytic decomposition of mercuric oxide. S. Z. Romanov, L. M. Sarozhnikov and N. A. Kucherenko. *Ukrainian Chem. Zhur.* 4, Sci. Pt. 09, 119 (1929); cf. C. A. 23, 755.—Formation of a film of reaction products prevents further action of the catalyst but induces autocatalytic reactions. Catalysts differ in their ability to form autocatalytic centers and in the temp. required to start the reaction. Autocatalysts and heat evolved obscure the real catalytic effect. If the reaction occurs in the solid phase its velocity is proportional to the no. of contacts between crystals, and the change in the velocity with the change in the amt. of catalysts is expressed by:  $A_p/A_i = M_p/(M_p + M_s\Delta)$  and  $A_p/A_i = M_p\Delta/(M_p\Delta + M_s)$  ( $A_p$ ,  $A_i$  are resp. no. of contacts of crystals of the substance with those of the catalyst, of catalyst crystals with each other and of crystals of the substance with each other,  $M_p$  and  $M_s$  are wts. of catalyst and of the substance,  $\Delta$  is ratio of sp. gr. of catalyst and of the substance). The equations were verified for the decomposn. of  $HgO$  in the presence of  $CuO$ . Sepns. of intermediate compds., not detected in these expts., was attempted by a new general method of condensing them on cooled surfaces. Induction period and self-acceleration of the reaction were not observed. In the presence of large quantities of finely dispersed catalysts the equation  $dx/dt = K(a - x)^2$  holds, except at the end of the reaction when the size of decomposing crystals reaches that of the catalyst. All catalysts of the oxide group accelerate the reaction except  $Cr_2O_3$ , which reacts chemically with  $HgO$ . In the dissoci. of solid compds. the equil. pressure of O is const. The action of catalysts is confined to places of direct contact, and is due to the strong elec. fields formed on the surface of the catalysts. V. Vesskovsky

APPENDIX METALLURGICAL LITERATURE CLASSIFICATION







*CA* 2  
The possibility of activated adsorption on molecularly plain surfaces. A. MACID  
AND S. REICHENBACH. *Physik Z. Sowjetunion* 1, 502(1932).

Activated adsorption and its role in catalysis. O. LEIPUNSKII AND S. BOGDANOVICH.  
*Physik Z. Sowjetunion* 1, 503-4(1932).—Outline of proposed work. P. H. EMMETT

Mechanism of the phenomenon of "memory" on repeated crystallization. S.  
ROTHSCHILD, I. SENKA AND I. ZATKOWICZ. *Physik Z. Sowjetunion* 1, 530-9(1932).  
All theories proposed for this phenomenon depend upon the presence of residual micro-  
crystals in the melt. A refractometric study of fresh, stable and unstable nitroglycerin

yields data incompatible with the isomeric theory. For the investigation of wall effects,  
expts. on rubbing the interior wall of the test tube were made. The results indicate  
that rubbing action and the previous history of the glass surface have much influence  
Howard ANTHONY SMITH

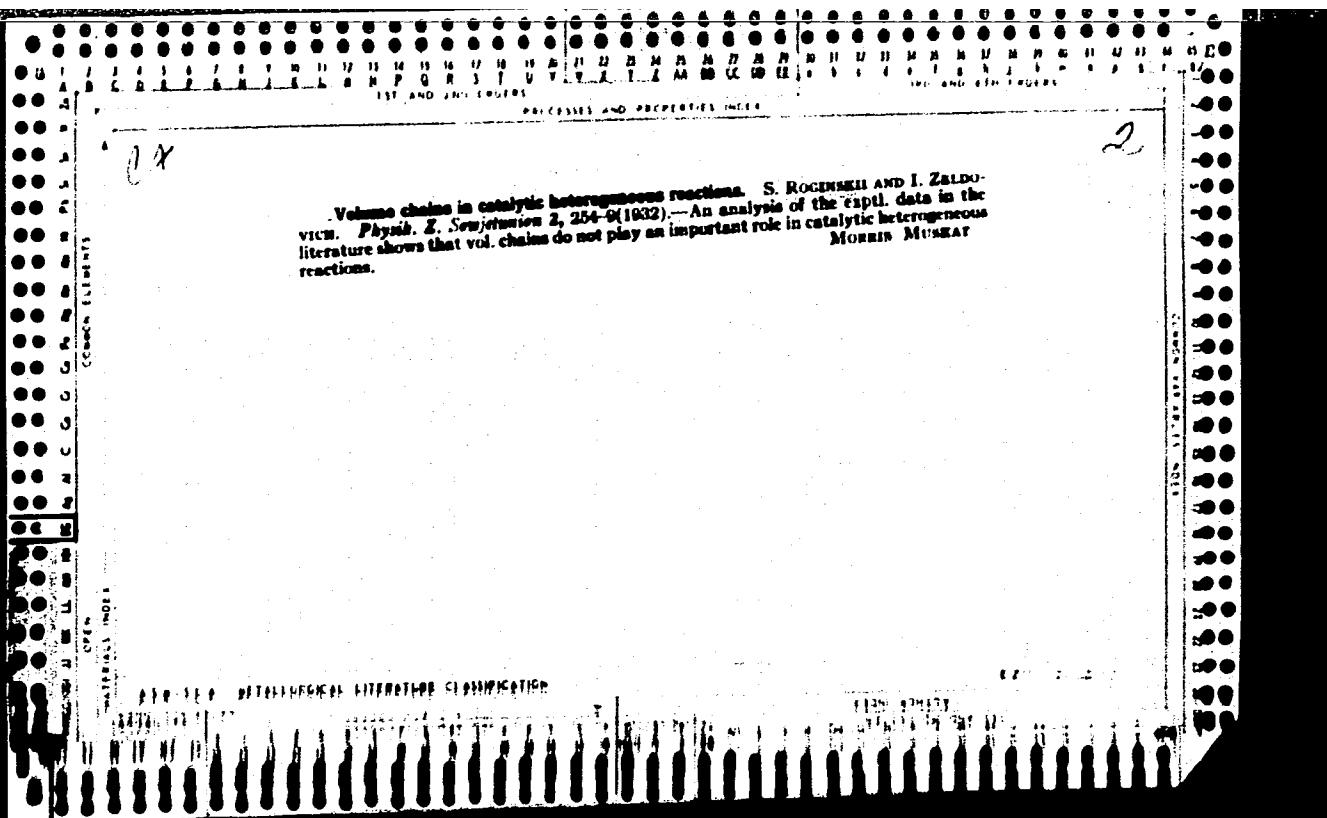
ABR-SEA METALLURGICAL LITERATURE CLASSIFICATION

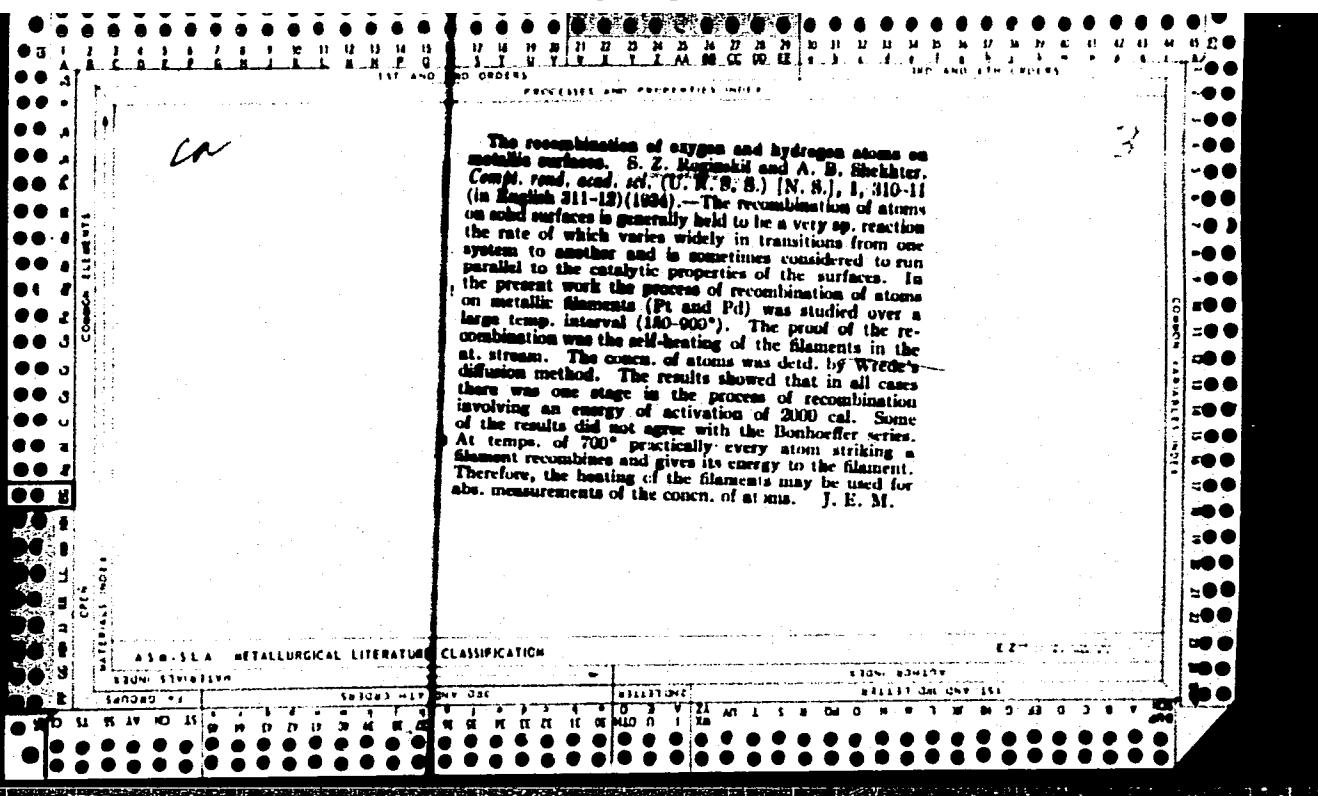
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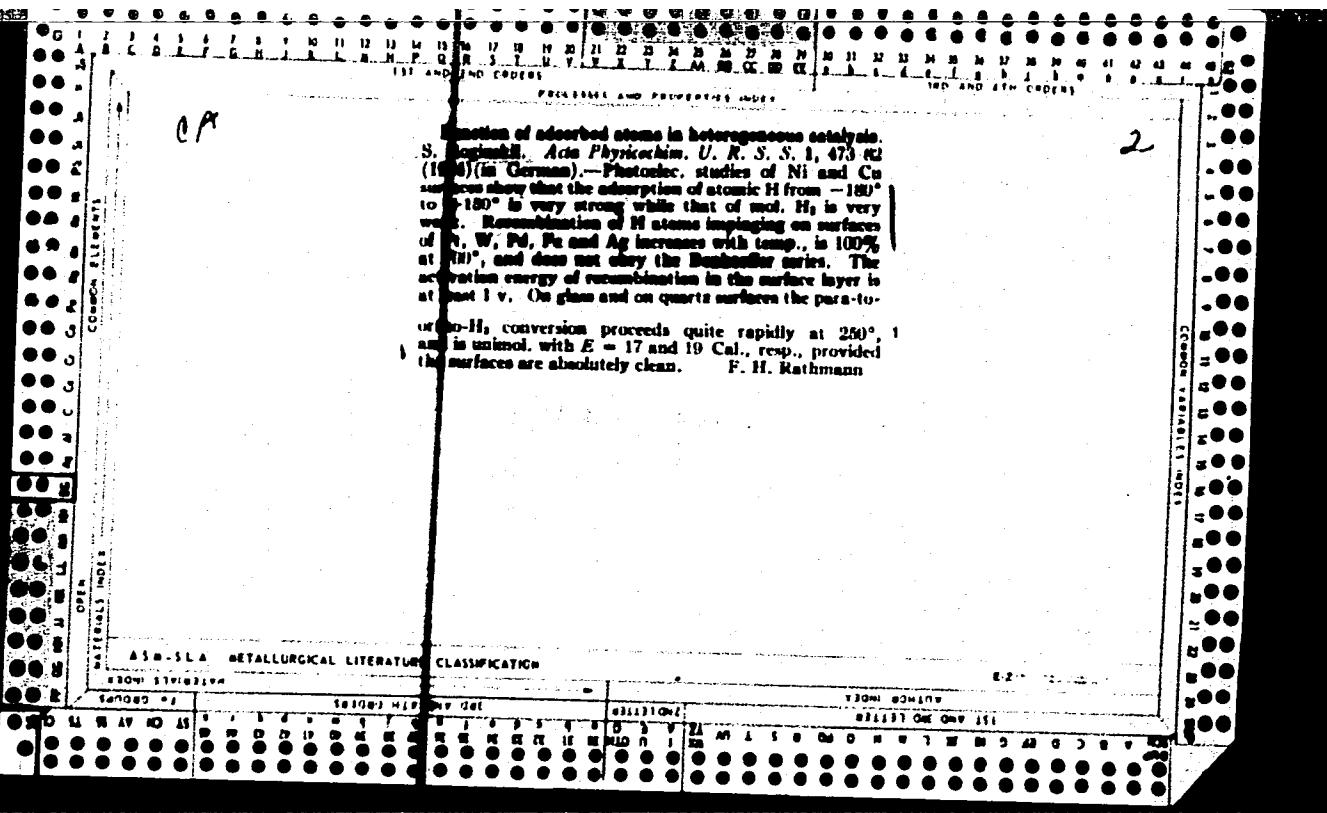
**The decomposition of explosives at low temperatures.** S. RODINAKI. *J. Russ. Z. Sovremennoj 1, 640 (1932).*—The heat of activation and the Arrhenius const.,  $B$ , were determined for the monomolecular decompsn. of nitroglycerin (I) and found to be 48,000 cal. and  $4 \times 10^{-9}$ , resp. Similar values were calculated from published data for I and pyroxylin at several temps., liquid and cryst. tetritol (II), gun cotton, tritol (III), picric acid and picryl azide. A destr. of the characteristics of the self-accelerated decompsn. of I and III indicate that this is a sp. chain reaction. Heats of activation for autocatalytic decompsn. were calculated for I, II and III to be 24,000, 18,000 and 27,000 cal., resp. Equations are derived for the velocity of the autocatalytic decompsn. of I and III catalyzed by stable end products. The course of the explosive autocatalytic decompsn. of I was studied at low temps., and a simple relation is deduced for the time of appearance of the explosion as a function of the temp.. The feasibility of establishing the kinetic type of decompsn. for the classification of explosives is discussed. HOWARD ADOLPH SARTOR

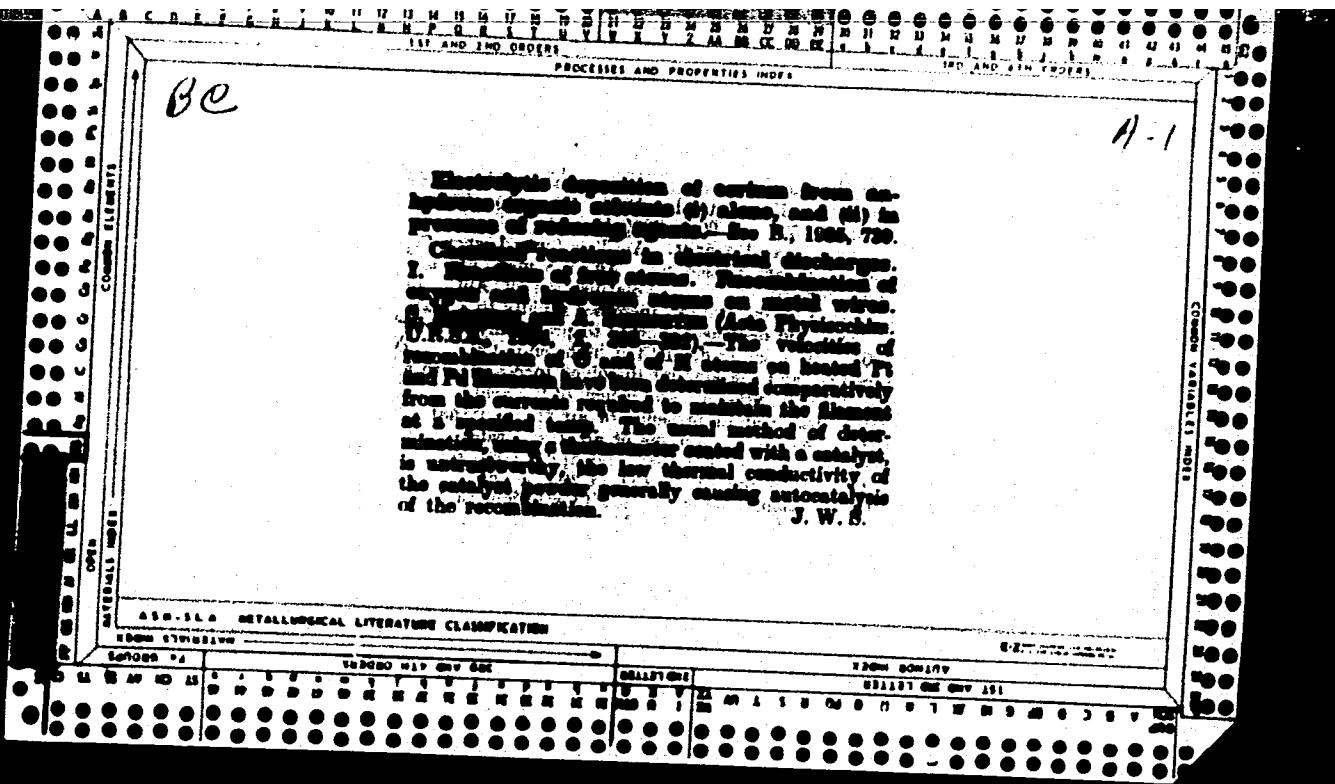
Howard Aiken's name

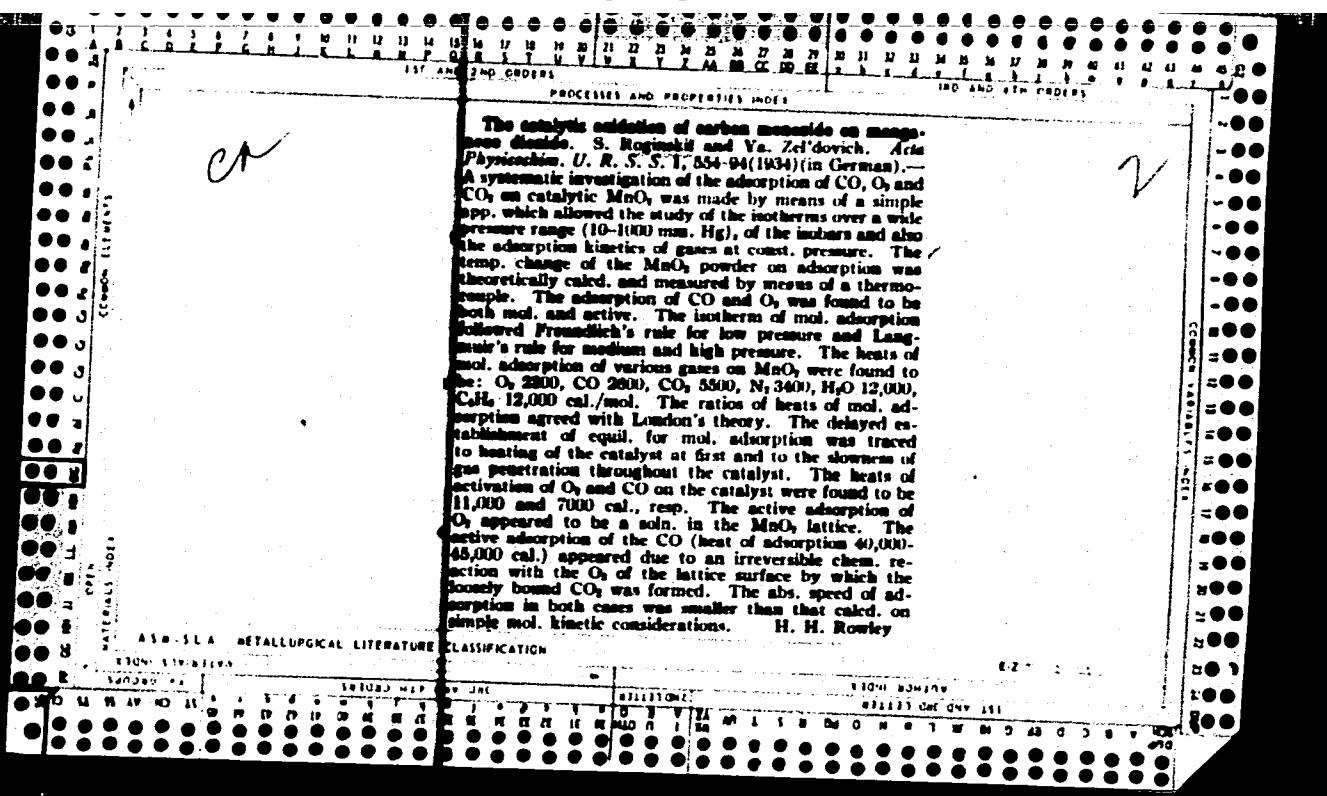
**APPROVED FOR RELEASE:** Tuesday, August 01, 2000      **CIA-RDP86-00513R0014451**

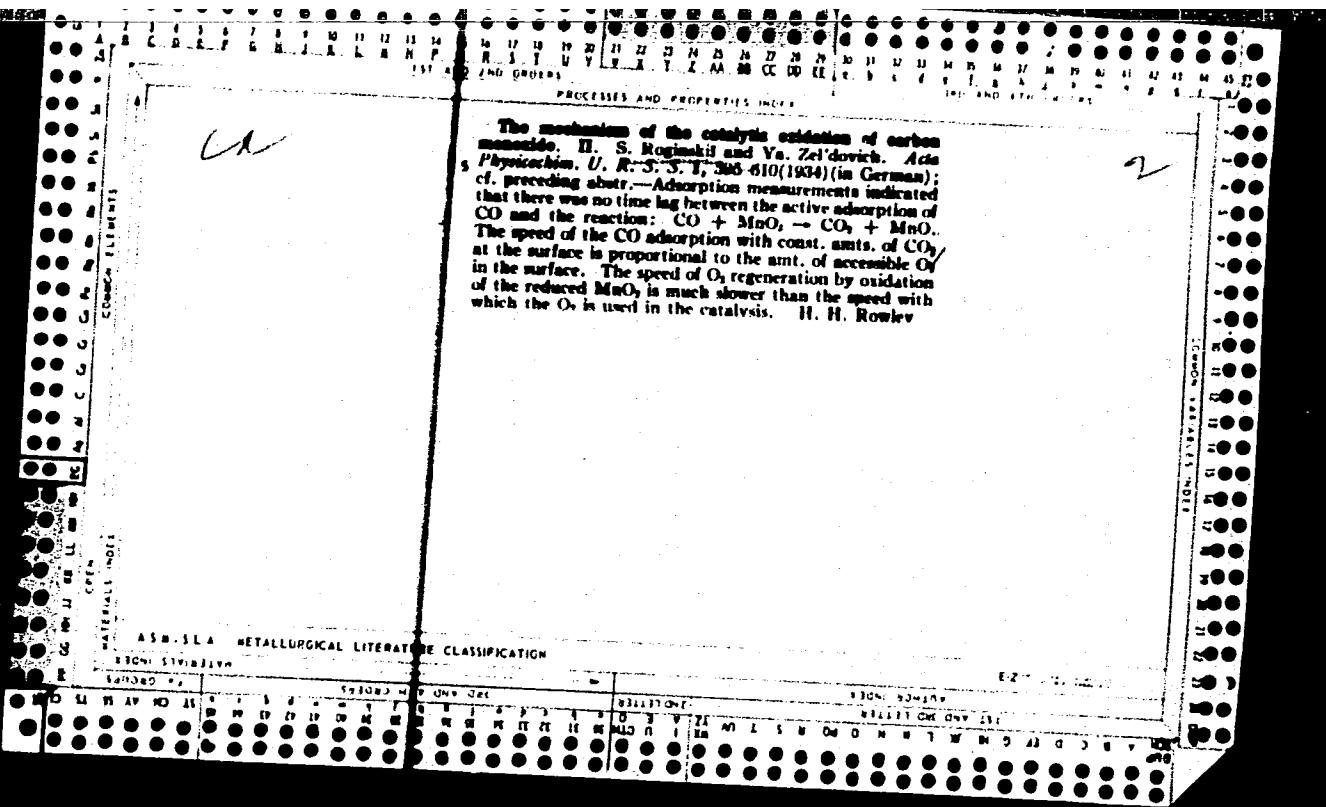


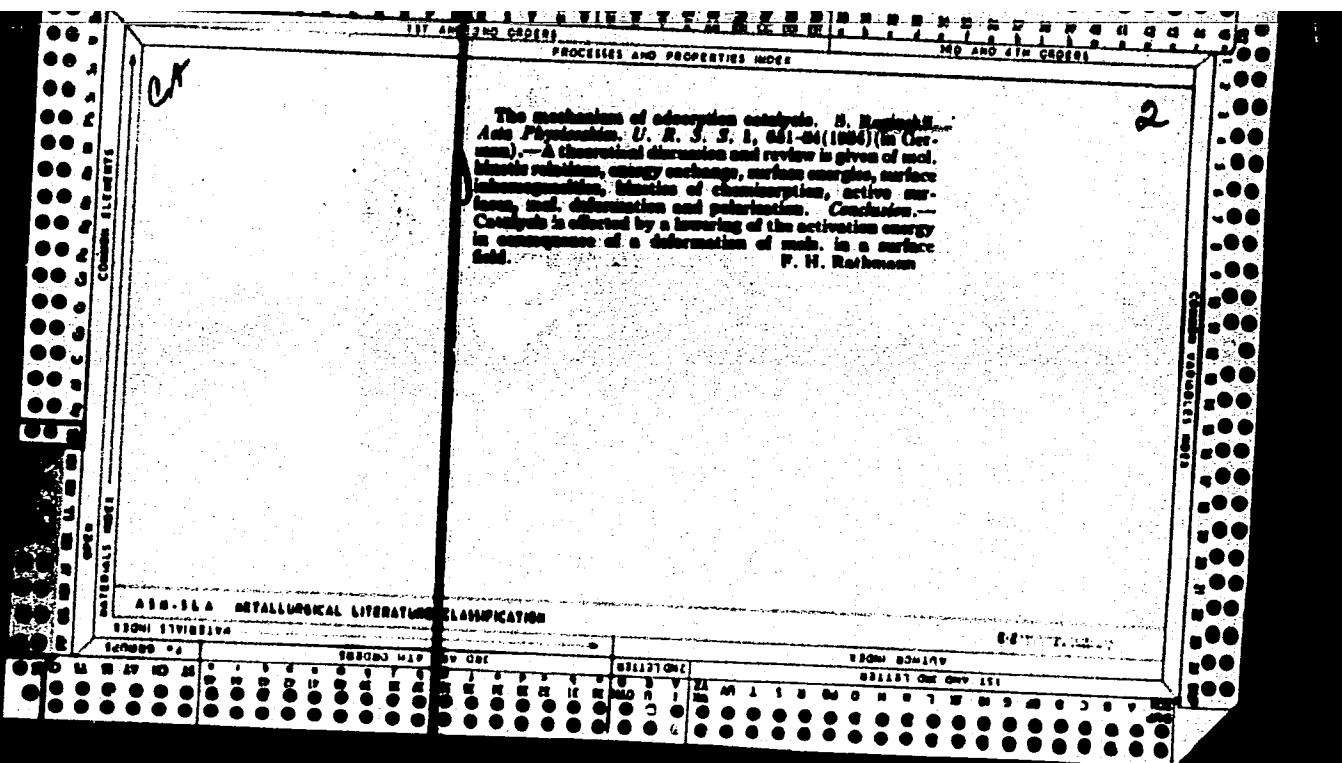








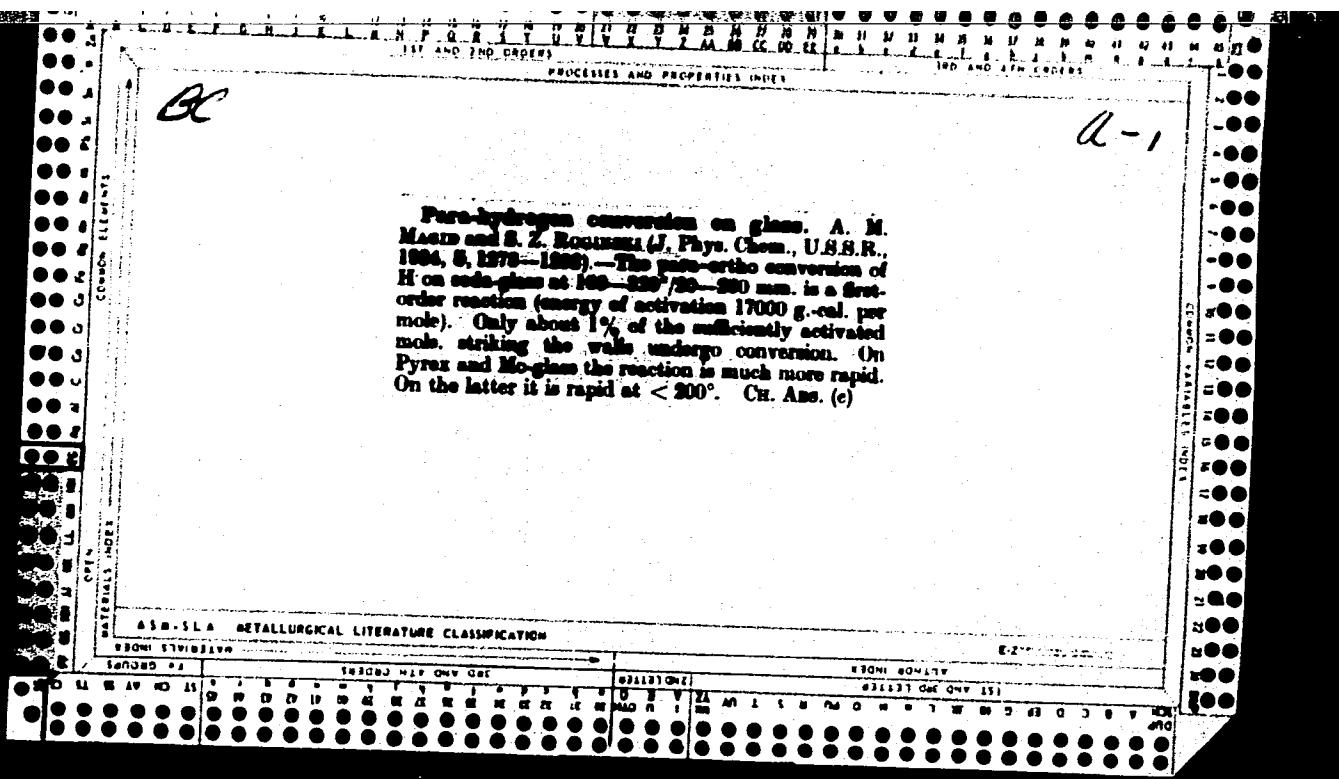


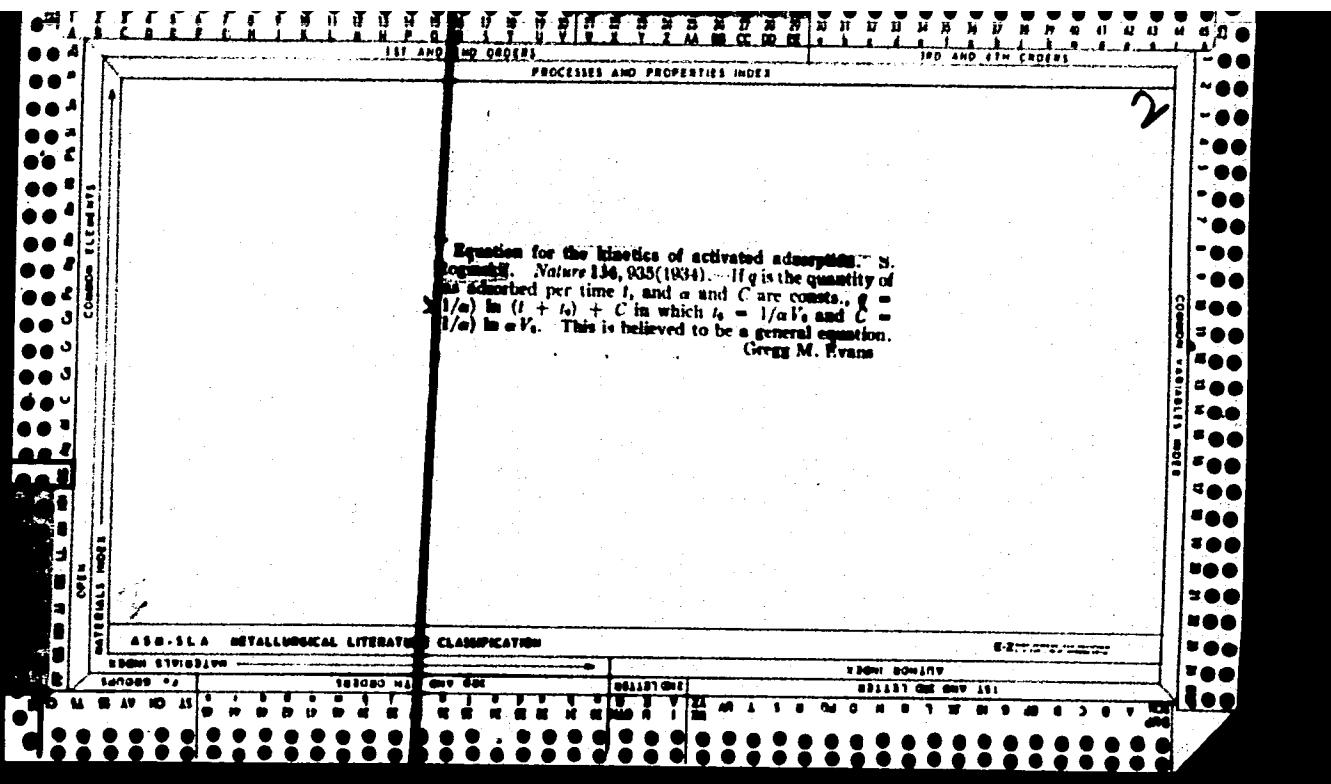


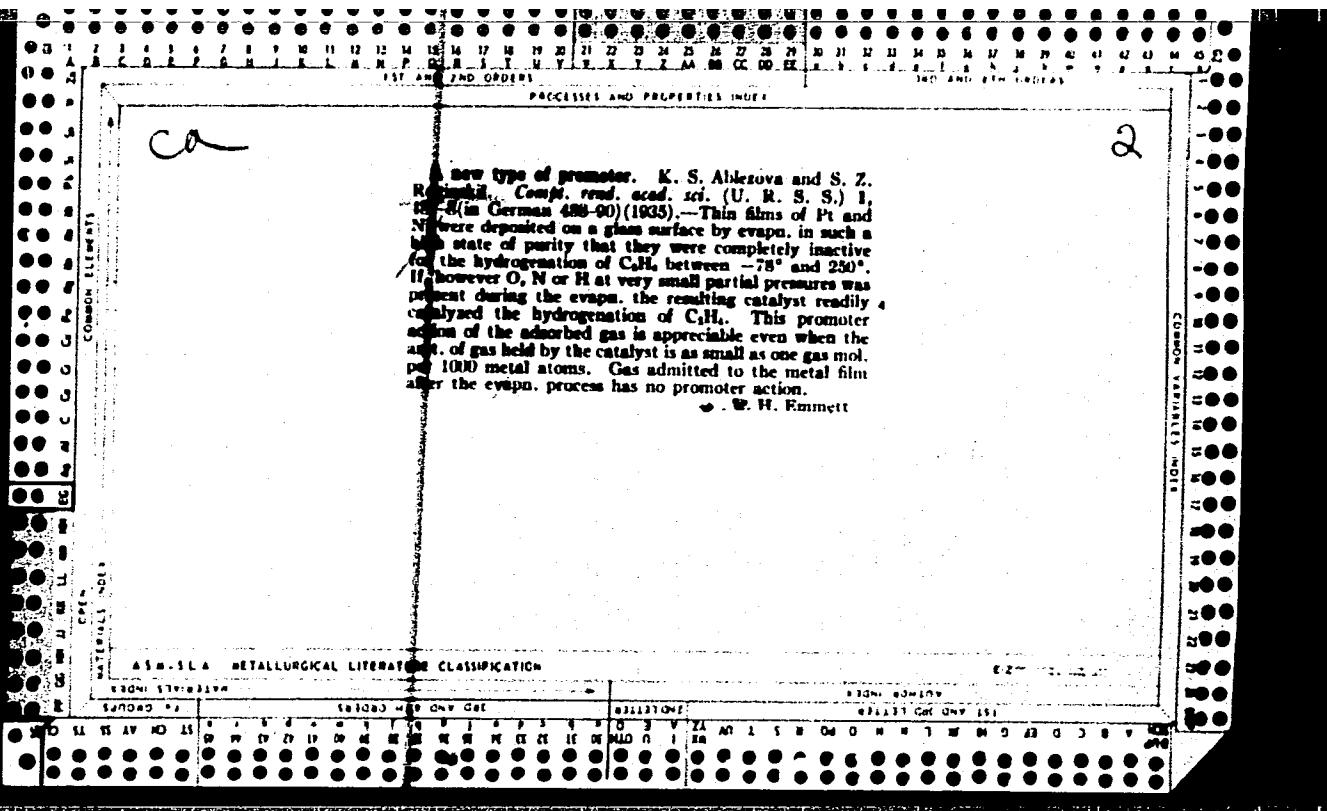
*Formation of ammonia by the impact of positive ions.* I. Mardon, N. Ringerhoff, F. Feldein, and A. Siekmann, *Compt. rend. Acad. sci. (U. R. S. S.)*, 7, 365-7 (in German 1937-9) (1938).—The effect of the ions of the alkali metals on the synthesis of NH<sub>3</sub> was studied; the crit. voltage required to initiate the reaction increases with at. wt., as follows: Li, 24-28 v.; Na, 30-40 v.; K, 40-50 v.; Cs, 120-128 v. The action of the positive ion is ascribed to the production of an active form of N<sub>2</sub>; it is able to take up more energy than H<sub>2</sub>, because of its larger mass. 2NH<sub>3</sub> were produced per ion, indicating that both ions of N<sub>2</sub> react. E. B. Rushton

E. R. Kunkle

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014451







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**Hydrogenation by adsorbed hydrogen atoms.** K. S. Aboleva and S. Z. Ermakoff. *Compt. rend. acad. sci. (U. R. S. S.)* 1, 492-3 (in German 492-3) (1935).—Metal films that are completely incapable of catalyzing the combination of  $C_2H_2$  and  $H_2$  mols. will, when covered at  $-180^\circ$  with a layer of adsorbed H atoms, effect the hydrogenation at  $\sim$  below room temp. Furthermore, if  $C_2H_2$  is added at liquid-air temp., to a fresh film of Ni and, with at. H, the  $C_2H_2$  remains adsorbed even on warming the film to room temp., although in the absence of the layer of at. H neither  $C_2H_2$  nor  $C_2H_6$  is appreciably adsorbed by the Ni film at room temp. P. H. Emmett

P. H. EMMETT

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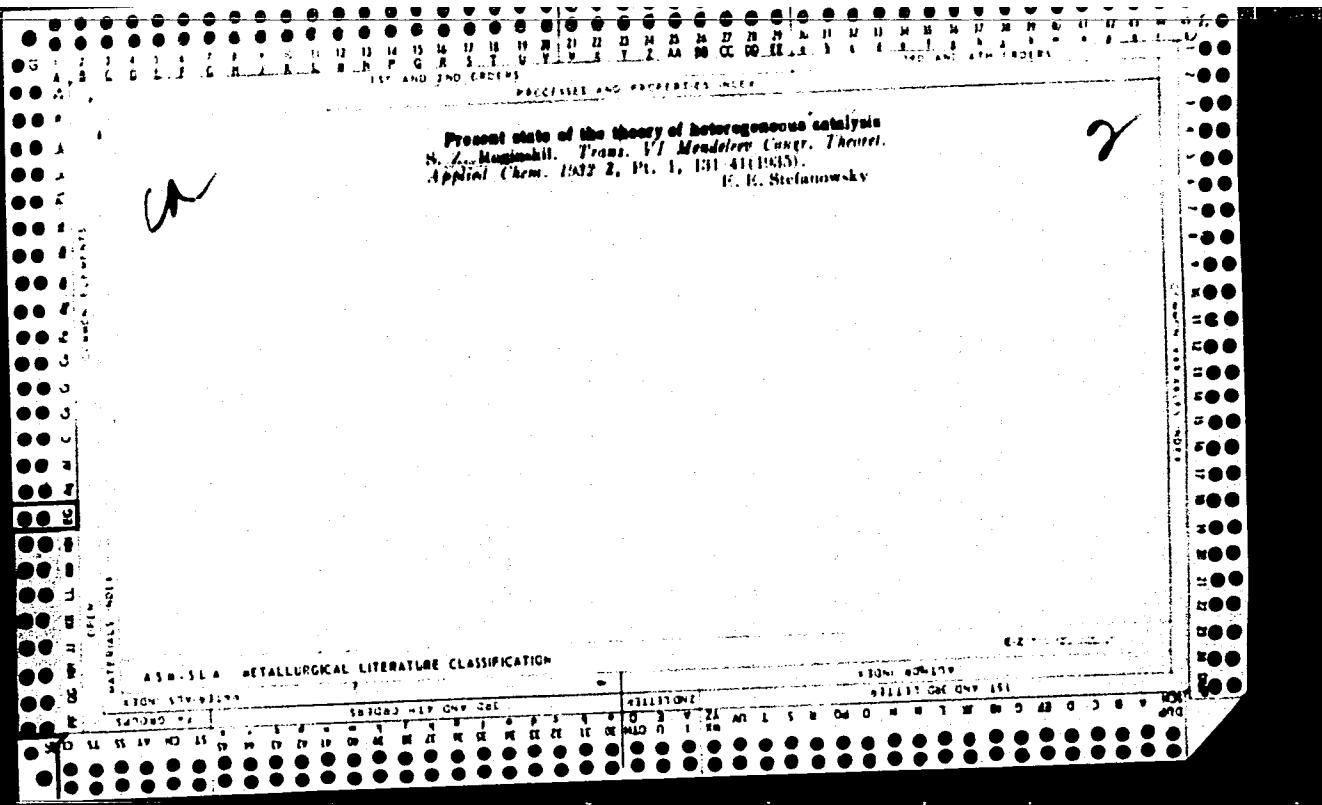
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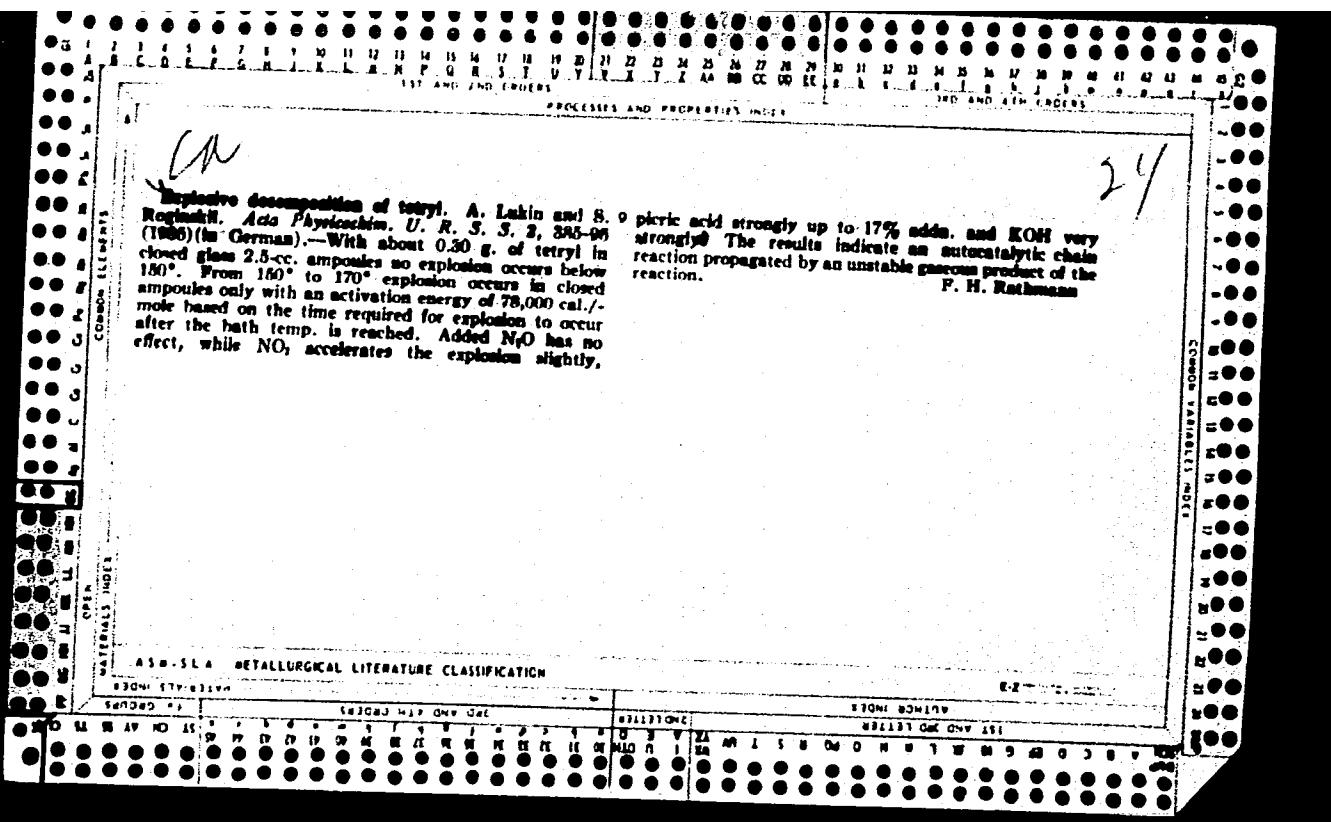
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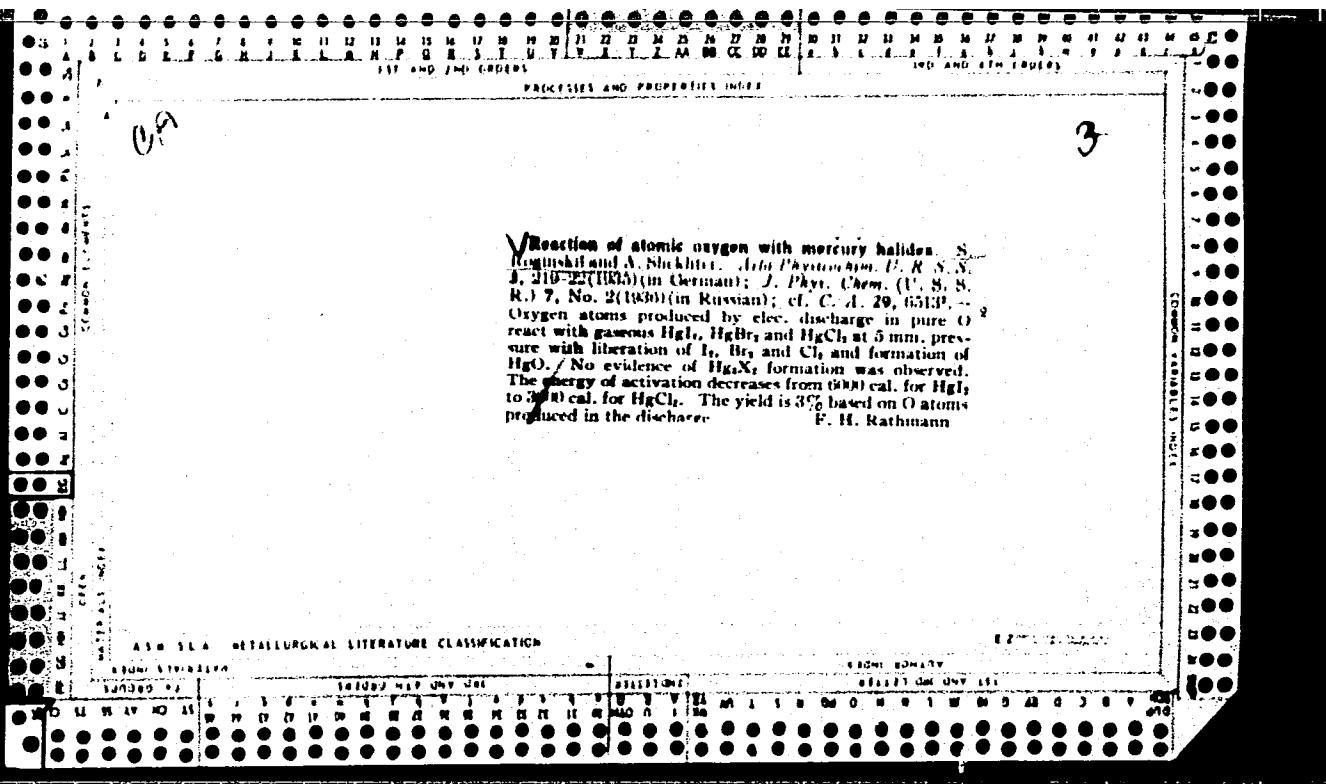
A.S.G.-S.L.A. METALLURGICAL LITERATURE CLASSIFICATION

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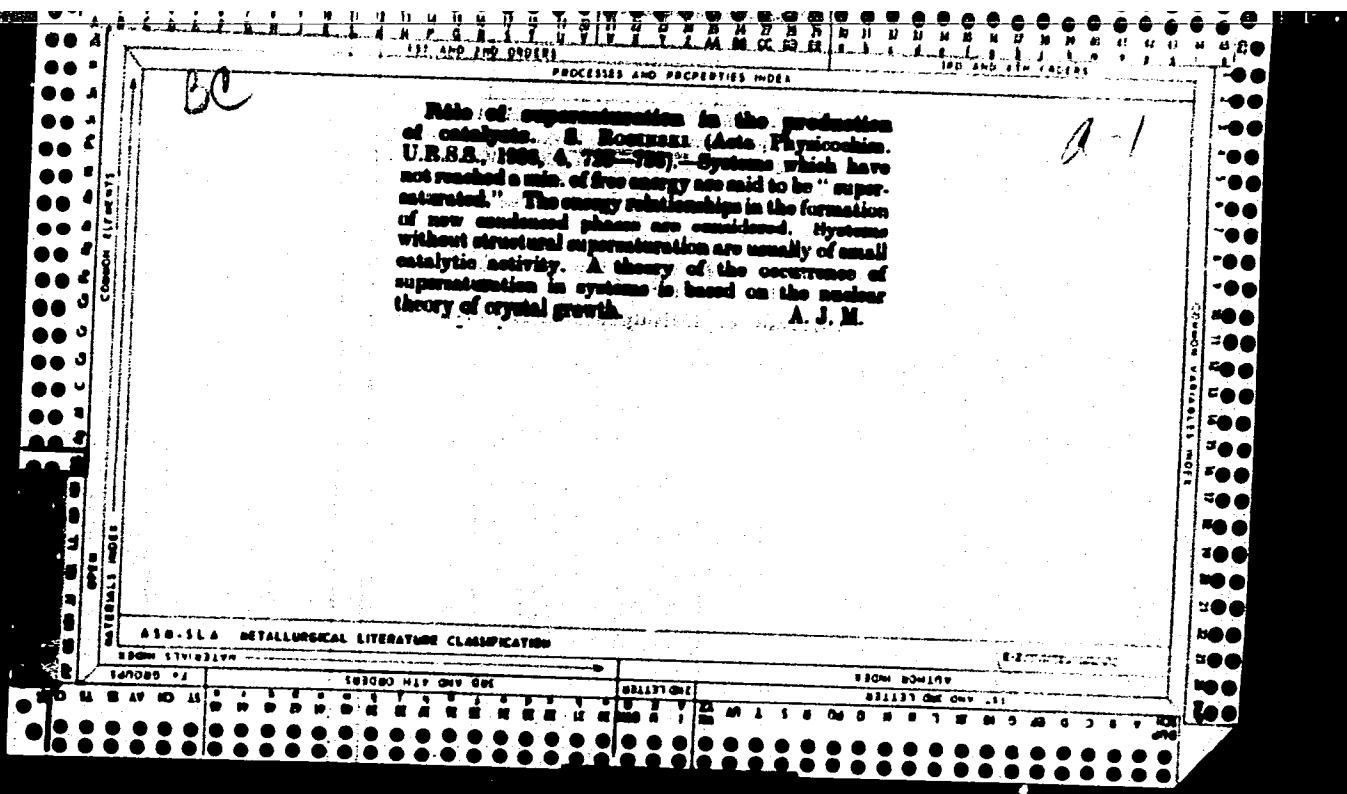


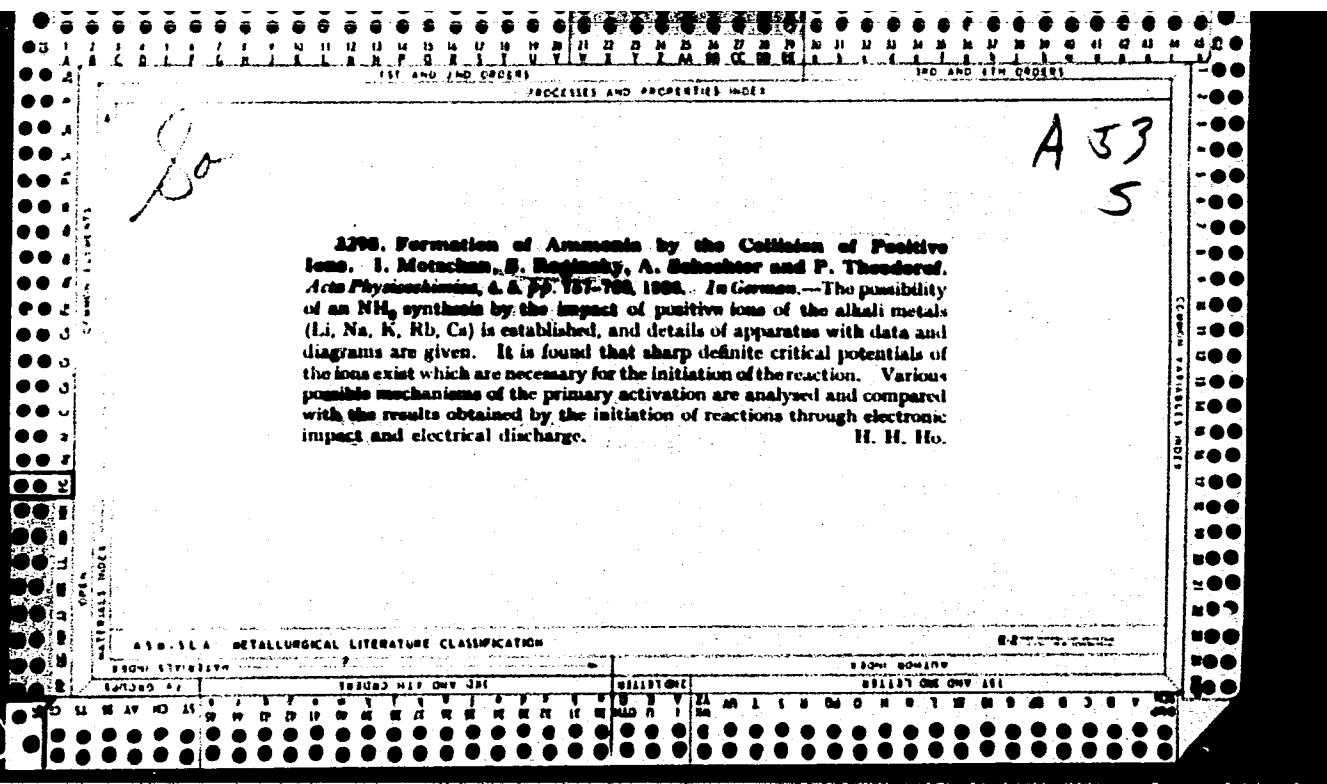
PROCESSES AND PROPERTIES INDEX

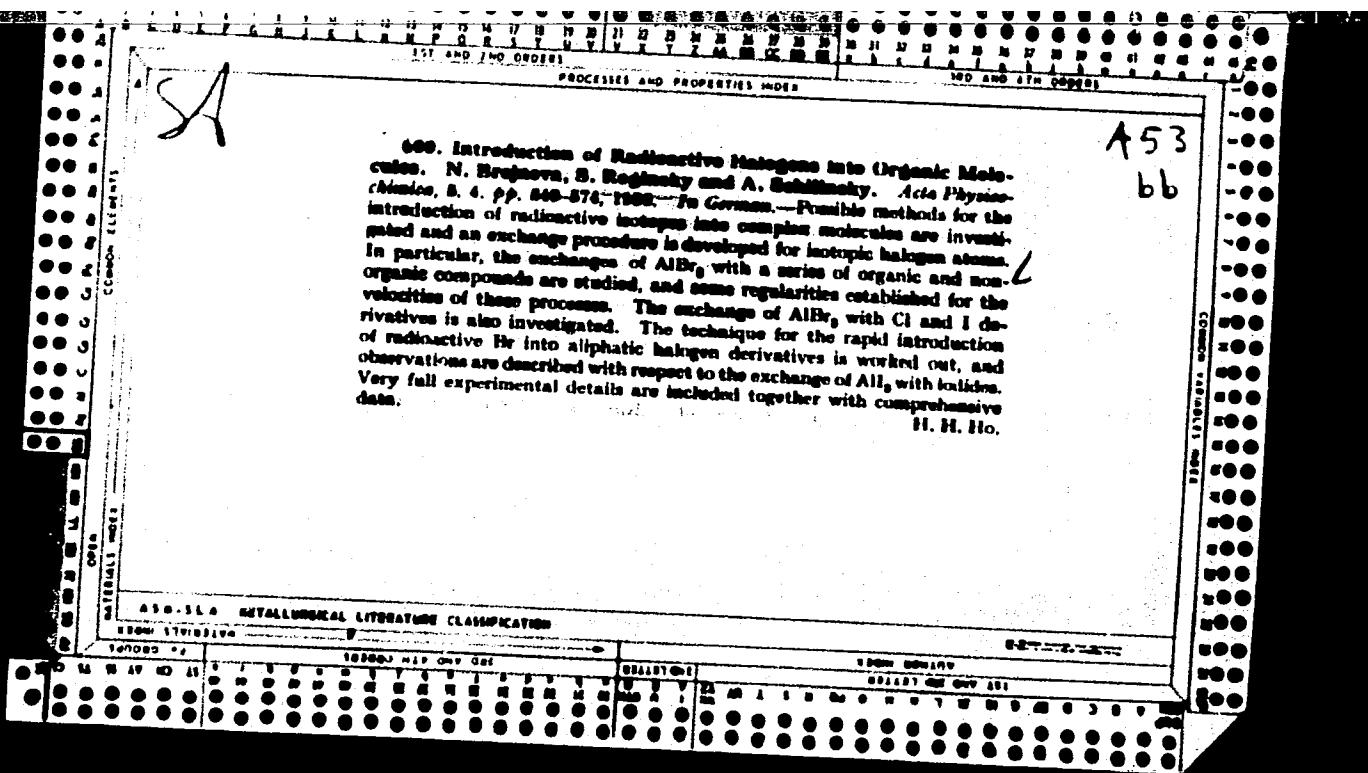
Application of radioactive bromine to the investigation of the mechanism of chemical reactions. B. BOURGEOIS and N. COOPERSON (Physiol. Z. Sankt-Peterburg, 1925, 7, 672-676).—Org. Br. added to C shows nearly no interchange with radioactive Br in  $\text{Br}_2$ , HBr, KBr, or  $\text{CaBr}_2$ . Passage of radioactive Br vapour over heated eq. KBr, or dissolution and subsequent evaporation of radioactive Br from eq. KBr, leads to complete distribution of the activity. At high temp.  $\text{NaBr}$  and  $\text{AlBr}_3$  show complete interchange of Br with the vapour phase. Heating of  $\text{CaBr}_2$  containing radioactive Br, to form  $\text{CaBr}$ , followed by re-conversion into  $\text{CaBr}_2$ , in non-radioactive Br cause < theoretical loss of activity, and after 8 cycles 50% of the activity remains, indicating that the valencies are unequal.

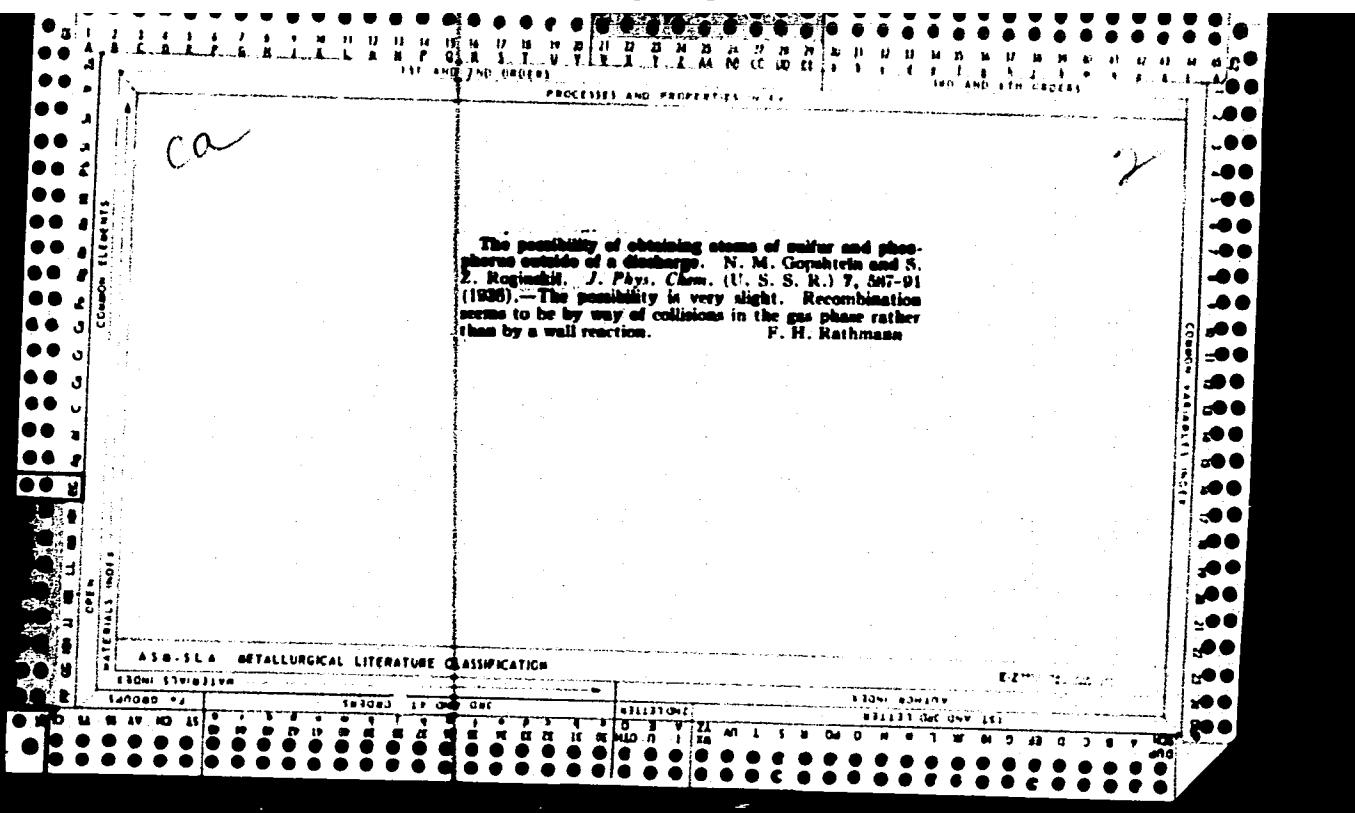
J. W. H.

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R00144451



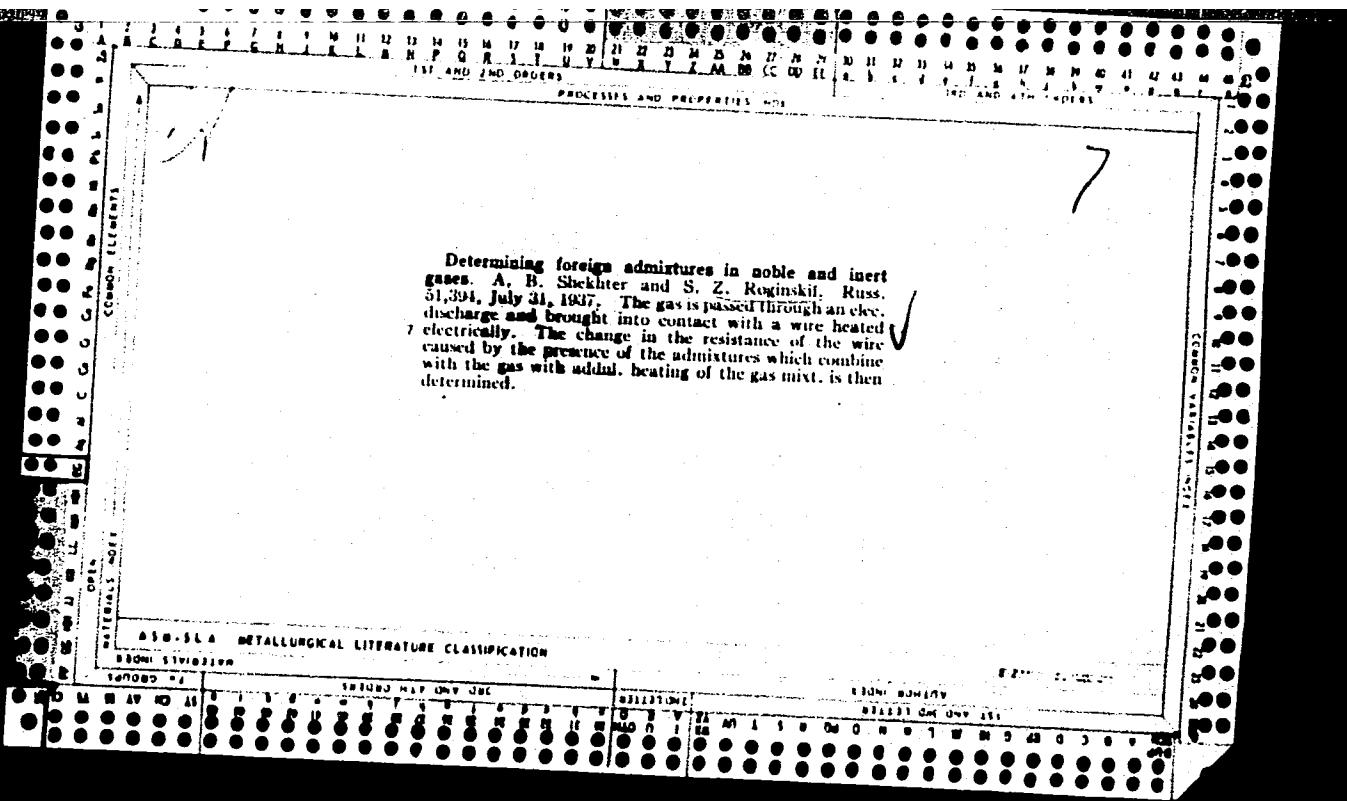






**A method for the introduction of radioactive halides into organic molecules.** N. E. Brezina, S. Z. Roginskii and A. I. Shilinskii. *J. Phys. Chem.* (USSR) **6**, 840-857 (1962).—Radioactive Br (prepd. by neutron bombardment of  $\text{Br}_2\text{Br}$  and extr., with  $\text{Ag}\text{-KBr}$ ) was introduced into a variety of org. and inorg. compds. by interaction with radiactivitated AlBr<sub>3</sub>. Radioactive Br compds. prepd. were ethyl, iminyl, phenyl,  $\alpha$ -naphthyl and benzyl bromides; ethylene dibromide, bromomethane, trimethylene bromide and  $\rho$ -dibromobenzene. For aliphatic compds. the exchange reaction is very rapid, as also for ionizing compds. even in the solid state. In polybromides, all the Br atoms take part in the exchange. For aromatic compds. at room temp., the exchange is only 20% complete after 1 hr. Benzyl bromide, like the aliphatic compds., exchanges almost immediately with an activation energy of not over 10 Cal. In a similar way radioactive FET interchanges to yield radioactive org. iodides. E. H. R.

ASME-SEA METALLURGICAL LITERATURE CLASSIFICATION											
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"APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R001445

**Acetylene.** S. Z. Roginskii and A. B. Shekhter. Russ. 5,436, July 31, 1937. Acetylene is prep'd. by the action of elec. impulse discharge on crude oil, tar and similar products containing much hydrocarbon.

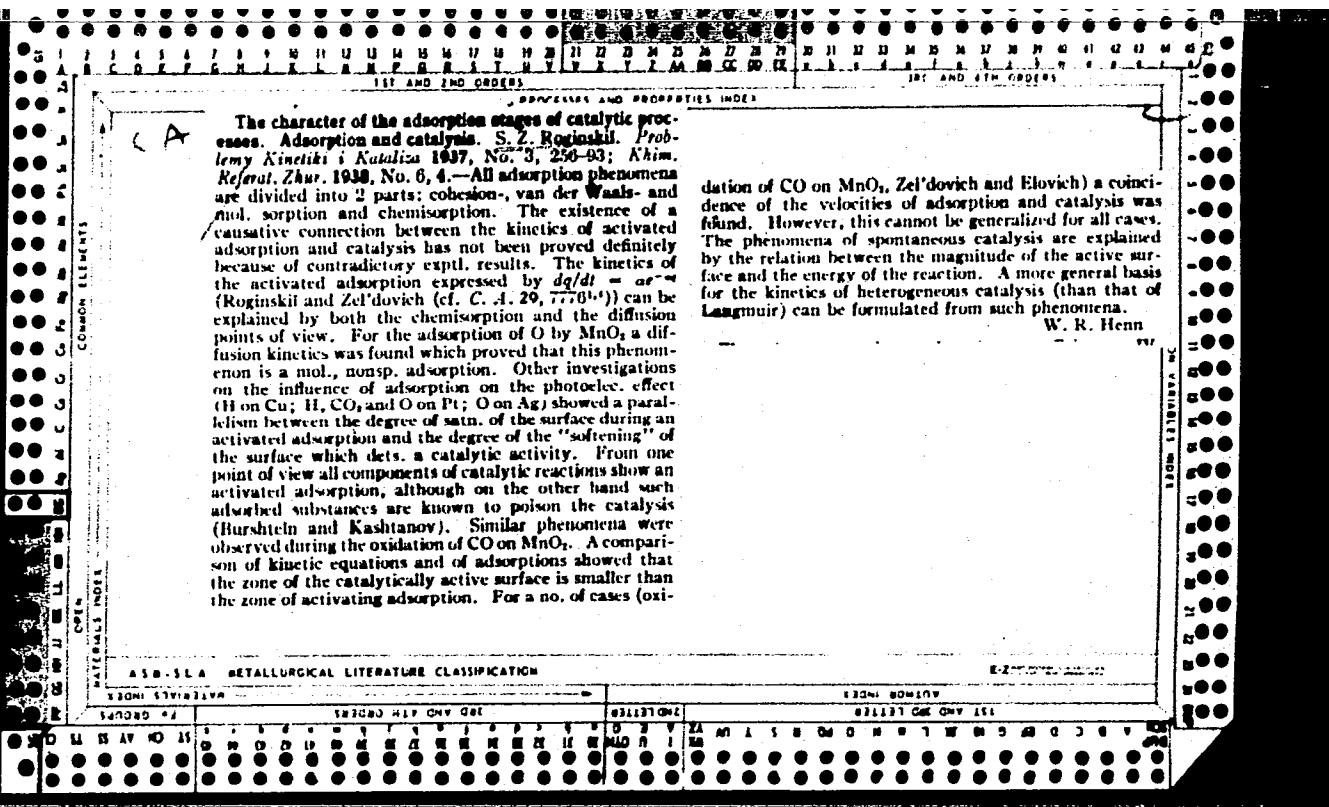
## ASM SE & METALLURGICAL LITERATURE CLASSIFICATION

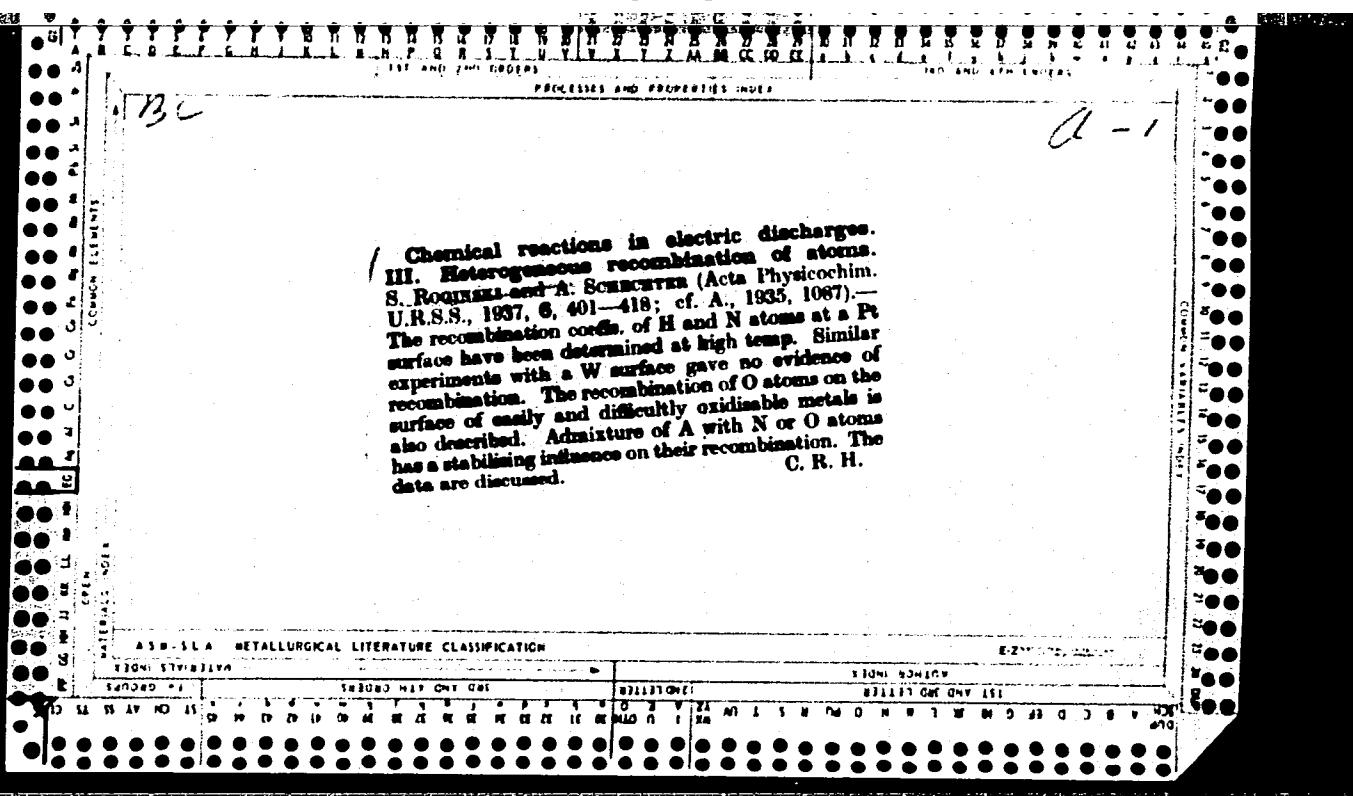
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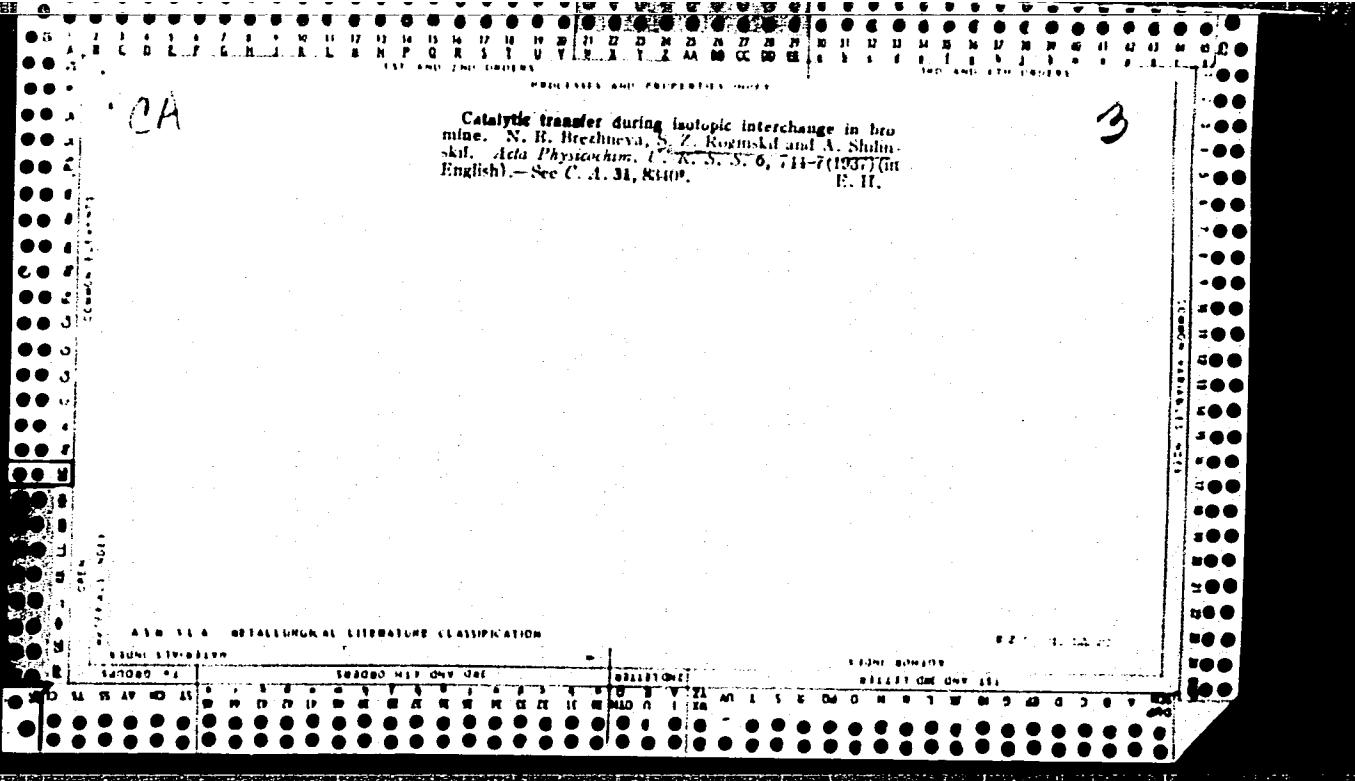
The character of the adsorption stages of catalytic processes. Adsorption and catalysis. S. Z. Roginskii. *Problemy Kinetiki i Kataliz* 1937, No. 3, 250-93; *Khim. Referat. Zhur.* 1938, No. 6, 4.—All adsorption phenomena are divided into 2 parts: cohesion-, van der Waals- and mol. sorption and chemisorption. The existence of a causative connection between the kinetics of activated adsorption and catalysis has not been proved definitely because of contradictory exptl. results. The kinetics of the activated adsorption expressed by  $dg/dt = a\tau^{\alpha}$  (Roginskii and Zel'dovich (cf. *C. A.* 29, 77701\*)) can be explained by both the chemisorption and the diffusion points of view. For the adsorption of O by  $MnO_2$ , a diffusion kinetics was found which proved that this phenomenon is a mol., nonsp. adsorption. Other investigations on the influence of adsorption on the photoelec. effect (H on Cu; H,  $CO_2$  and O on Pt; O on Ag) showed a parallelism between the degree of satn. of the surface during an activated adsorption and the degree of the "softening" of the surface which det. a catalytic activity. From one point of view all components of catalytic reactions show an activated adsorption, although on the other hand such adsorbed substances are known to poison the catalyst (Burshtein and Kashtanov). Similar phenomena were observed during the oxidation of CO on  $MnO_2$ . A comparison of kinetic equations and of adsorptions showed that the zone of the catalytically active surface is smaller than the zone of activating adsorption. For a no. of cases (oxi-

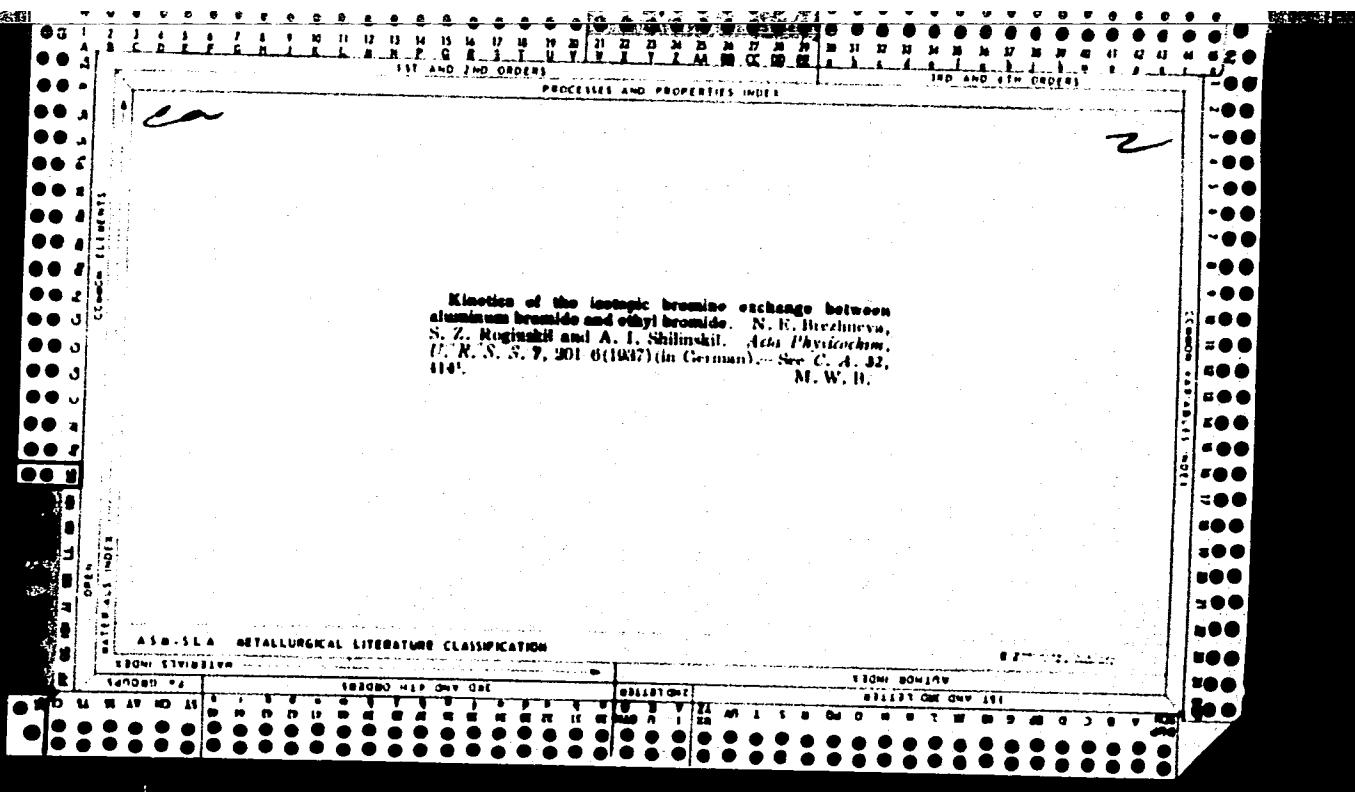
dation of CO on  $MnO_2$ , Zel'dovich and Elovich) a coincidence of the velocities of adsorption and catalysis was found. However, this cannot be generalized for all cases. The phenomena of spontaneous catalysis are explained by the relation between the magnitude of the active surface and the energy of the reaction. A more general basis for the kinetics of heterogeneous catalysis (than that of Langmuir) can be formulated from such phenomena.

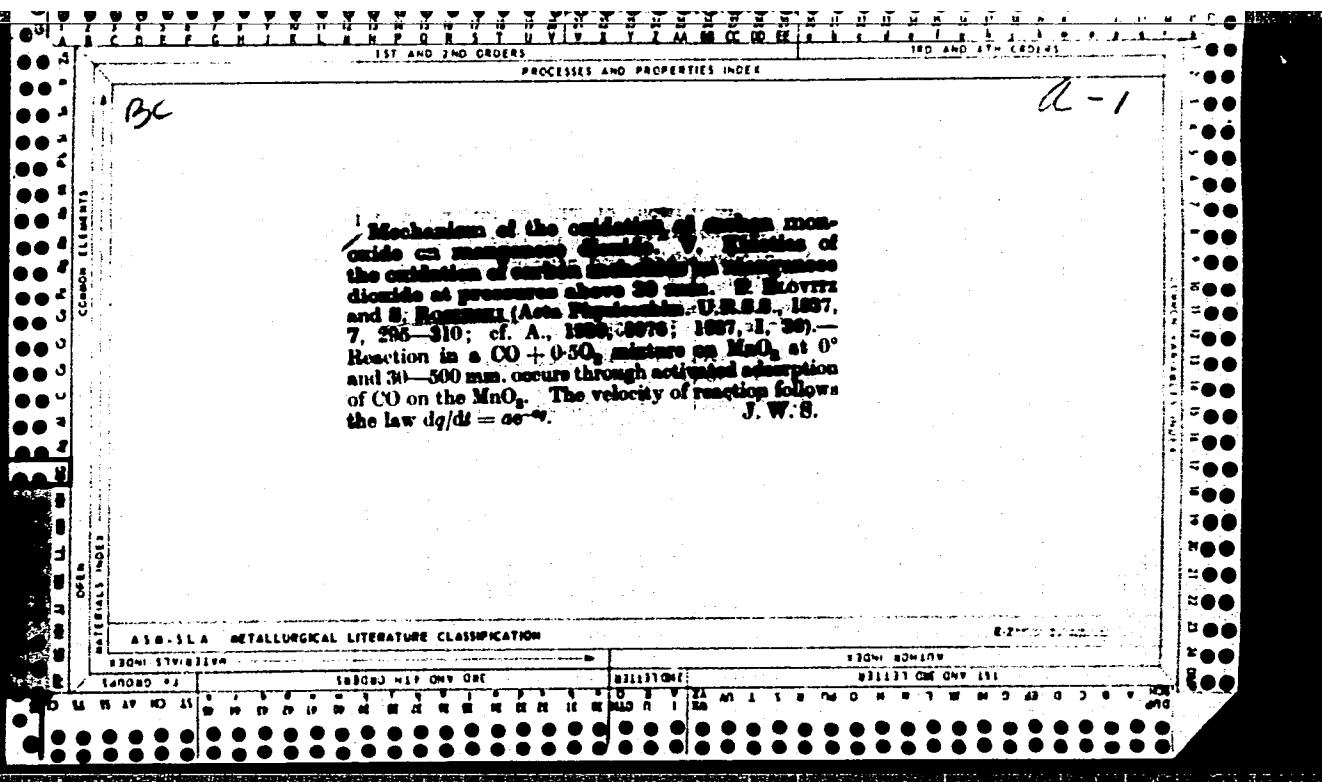
W. R. Henn





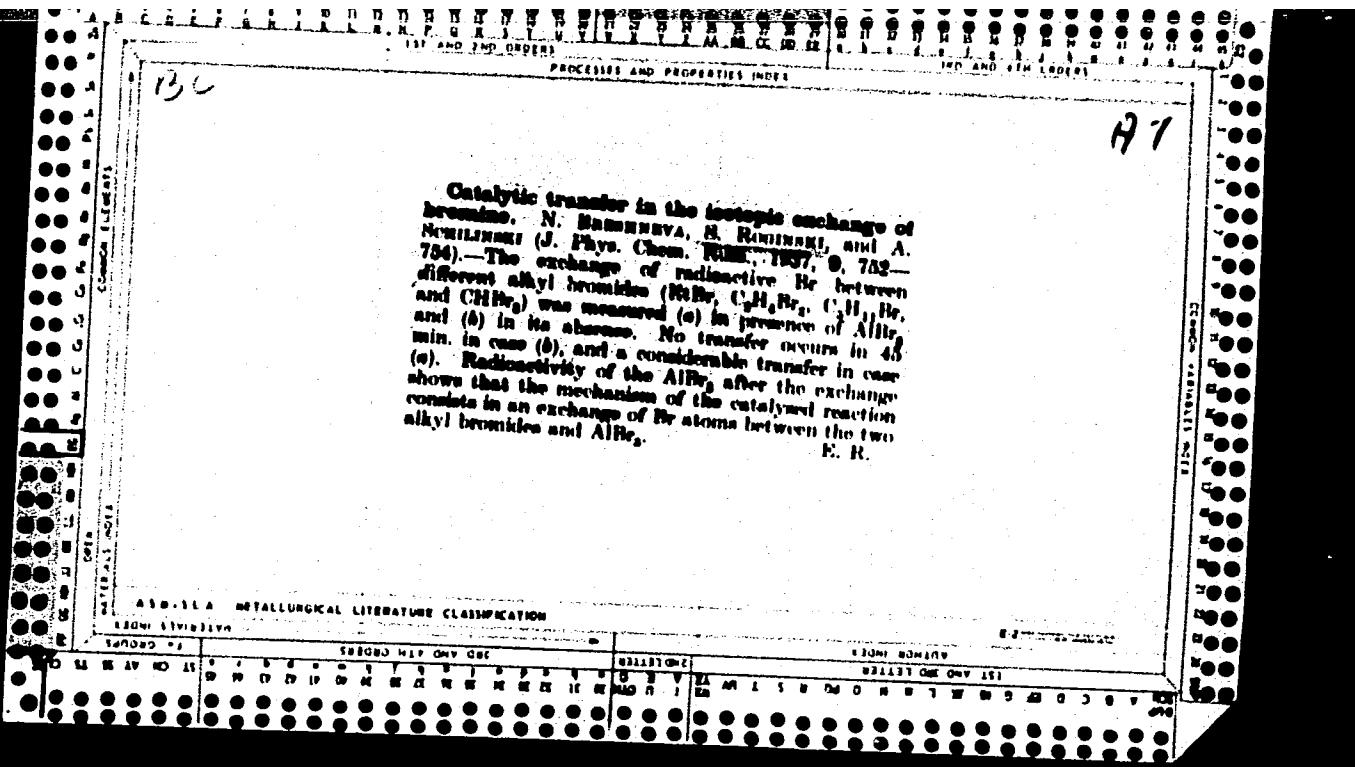




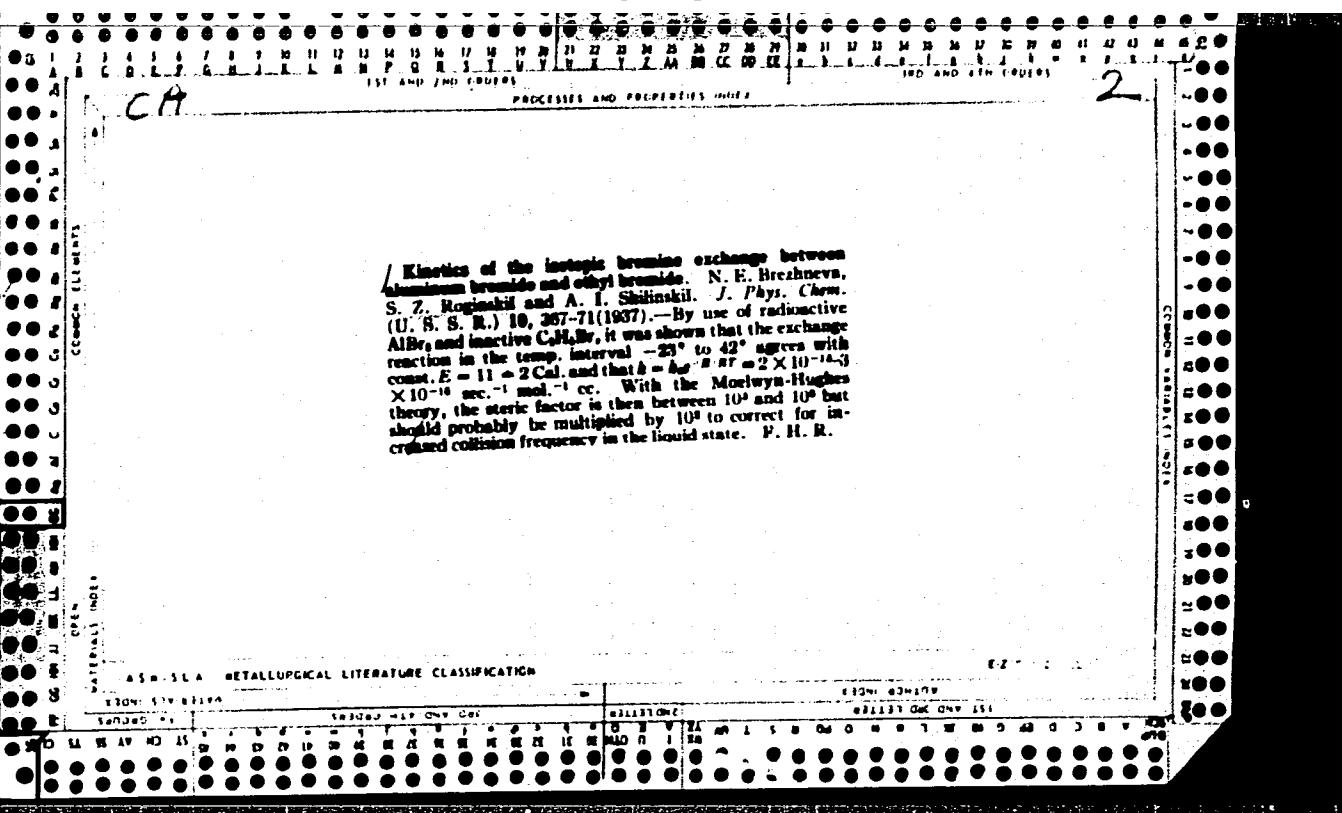


**Velocity of exchange of solvate molecules as determined by experiments with radioactive halogens.** N. E. Brezhnev, S. Z. Roginskii and A. I. Shilinskii. *J. Phys. Chem. U.S.S.R.* **9**, 206-9 (1937); cf. *C. A.* **31**, 20001.—Fractional pptn. by  $\text{AgNO}_3$  of a mixt. of a soln. of  $\text{NaI}$  in  $\text{EtOH}$  with a soln. of radioactive  $\text{NaI}$  in  $\text{H}_2\text{O}$  shows that active  $\text{Br}$  is pptd. first. From a mixt. of  $\text{NaI}$  in  $\text{H}_2\text{O}$  and active  $\text{NaBr}$  in  $\text{EtOH}$  inactive  $\text{Br}$  is pptd. first. This shows that  $\text{Br}$  solvated by  $\text{H}_2\text{O}$  reacts more quickly with  $\text{Ag}$  than  $\text{Br}$  solvated by  $\text{EtOH}$ , and that the exchange of  $\text{H}_2\text{O}$  and  $\text{EtOH}$  in the solvates of  $\text{Br}$  is a slow process requiring several hrs.<sup>o</sup>. B. C. A.

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Chemical reactions in electric discharges. III. Investigation of the heterogeneous recombination of atomic gases. N. Raghavan and A. Shekhter, *J. Phys. Chem.* (U. S. S. R.) 6, 780-90 (1972). A study of the recombinations of H atoms and of N atoms on W and Pt surfaces was made. At all temps. from 200° to 2000° abs. the H atom recombination has a pos. temp. coeff. corresponding to  $E = 2000$  cal. on both Pt and W. On Pt, the recombination coeff. for N atoms is approx. unity over the temp. range 1000-2000° abs., while on W, no recombination whatever took place. O atoms on W, Cu, Ni and Fe form a thin protective oxide coating. On W recombination of O atoms does not occur much, but CuO and NiO strongly catalyze recombination. Argon stabilizes the st. N states of N and of O atoms.  
F. H. Rathmann



B/C

2-1-2

CRACKING OF OILS BY CONDENSER DISCHARGES. S. Boginaki  
and A. Schechter (J. Accl. Chem. Russ., 1937, 10,  
473-486).

Heavy hydrocarbons (gasoline, anthracene oil) are decomposed  
by impulse condenser discharges, with production of  
 $C_2H_2$  and  $H_2$ . The yield of  $C_2H_2$  is 125 litres per kw.-hr.

R.T.

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A - 1

**ST AND END ORDERS** **PROCESSED AND ENROUTE INDEX**

CIA-RDP86-00513R001445

Mechanism of the oxidation of carbon monoxide by  $\text{MnO}_2$ . V. Kinetics of the oxidation of  $\text{CO}$  by  $\text{MnO}_2$ , at temperatures above 30 mm. S. J. JAKOBSON and B. A. KERBER; J. Phys. Chem. Russ., 1957, 29, 671. The ratio of formation of  $\text{CO}_2$ ,  $\text{dpm}/\mu\text{l}$ , has been measured between -30° and 17° and between 30 and 50° mm. It is approx. or ( $\text{CO}$ ) and almost independent of ( $\text{O}_2$ ). It rises with temp.; the heat of oxidation is 4 kq.-cal. In the course of time,  $\text{CO}_2$  concentration  $\text{dpm} = a\text{e}^{-bt} + c$ , being const.; this equation agrees with that of the activated adsorption (cf. A., 1955, 543). The effect of the pre-treatment of the catalyst has been investigated. J. J. B.

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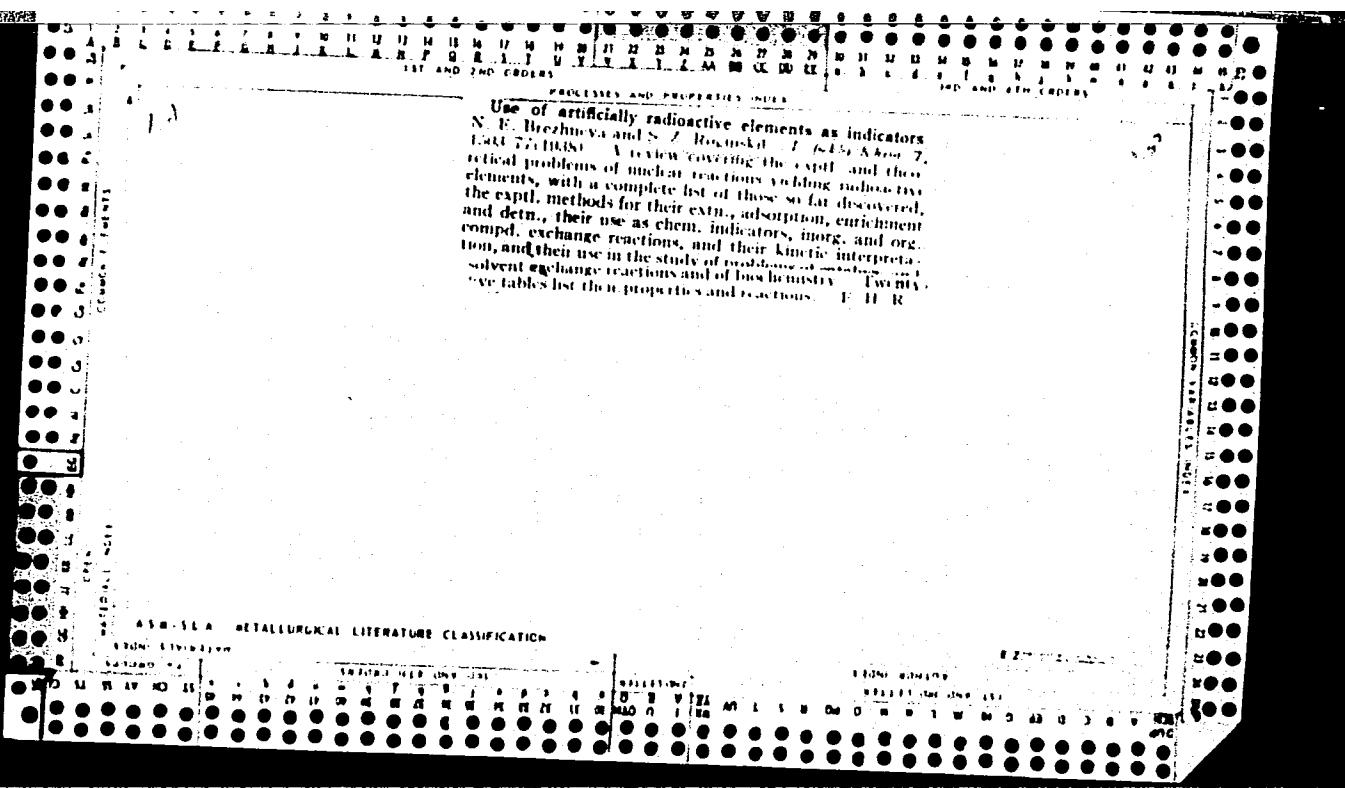
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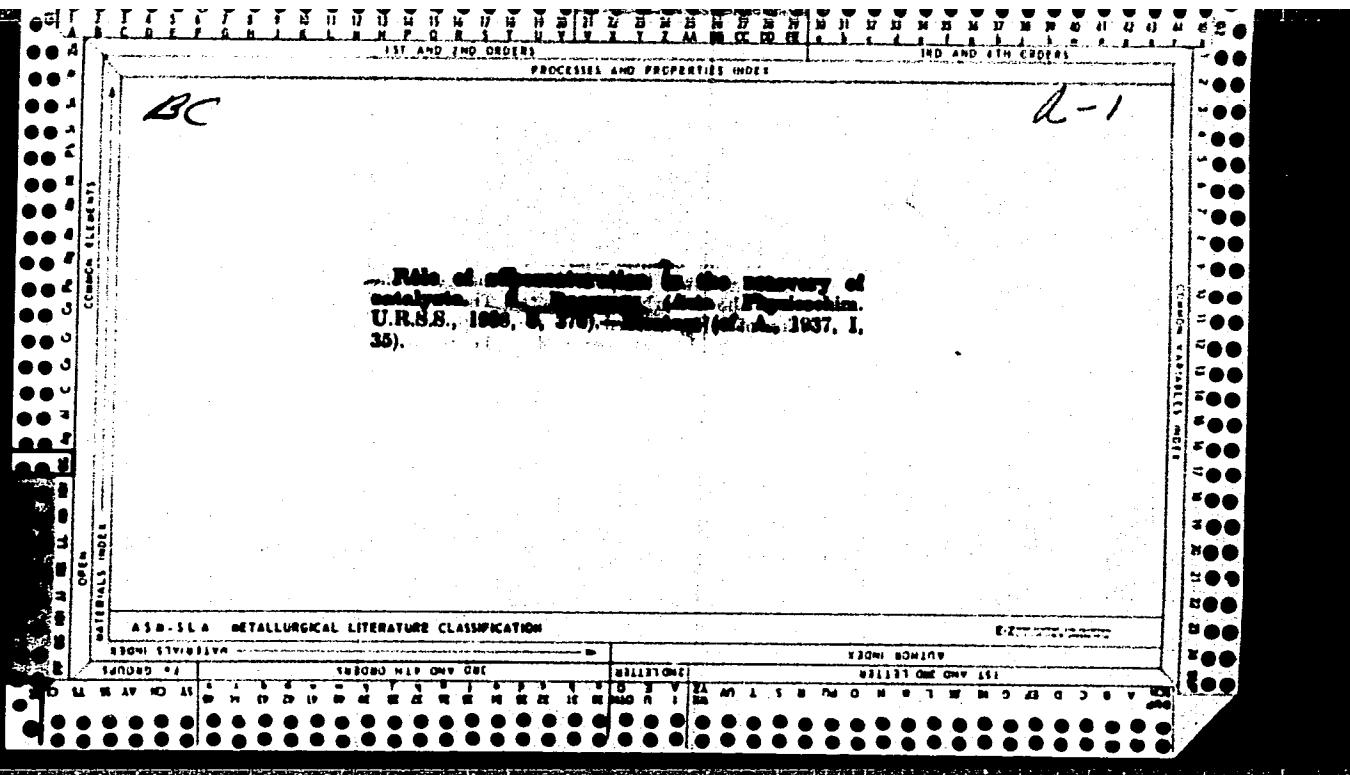
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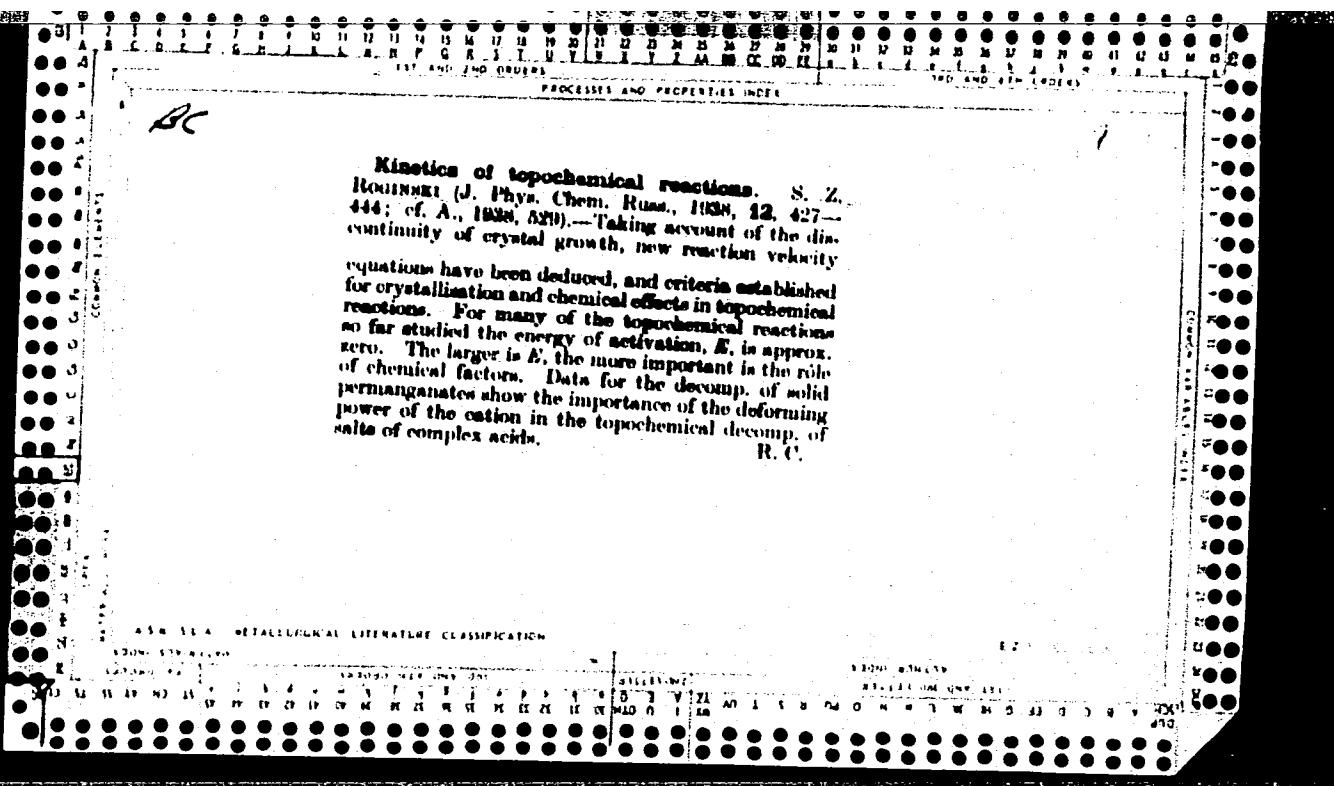
A-1

Mechanism of catalytic oxidation by molecular oxygen at low temperatures. S. ROGIŃSKI  
(Acta Physicochim. U.R.S.S., 1938, 9, 673-680).  
Published work by the author and others on the  
oxidation of NO on  $\text{SiO}_2$  gel, of CO on  $\text{MnO}_2$ , and  $\text{H}_2$   
on Pt and Pd is reviewed and possible mechanisms  
are discussed. C. R. H.

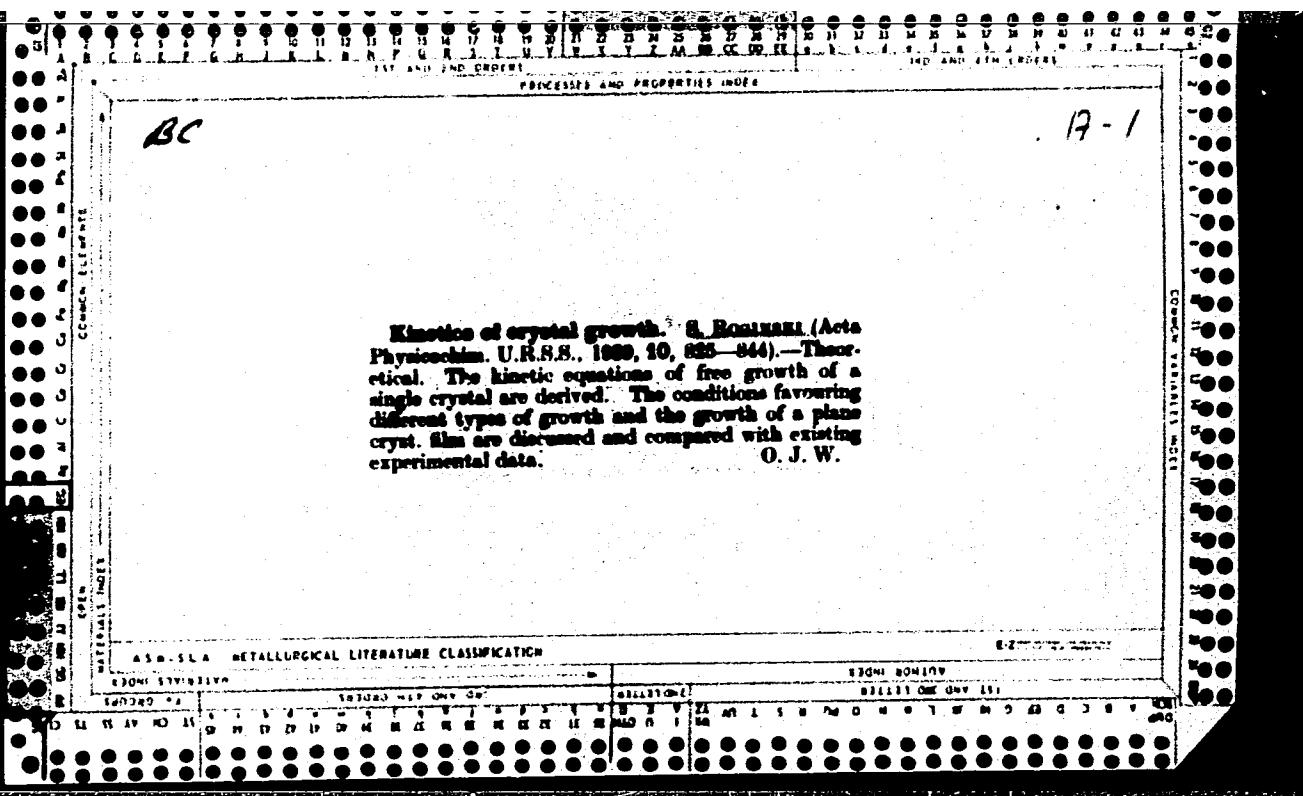
ASA-SLA METALLURGICAL LITERATURE CLASSIFICATION

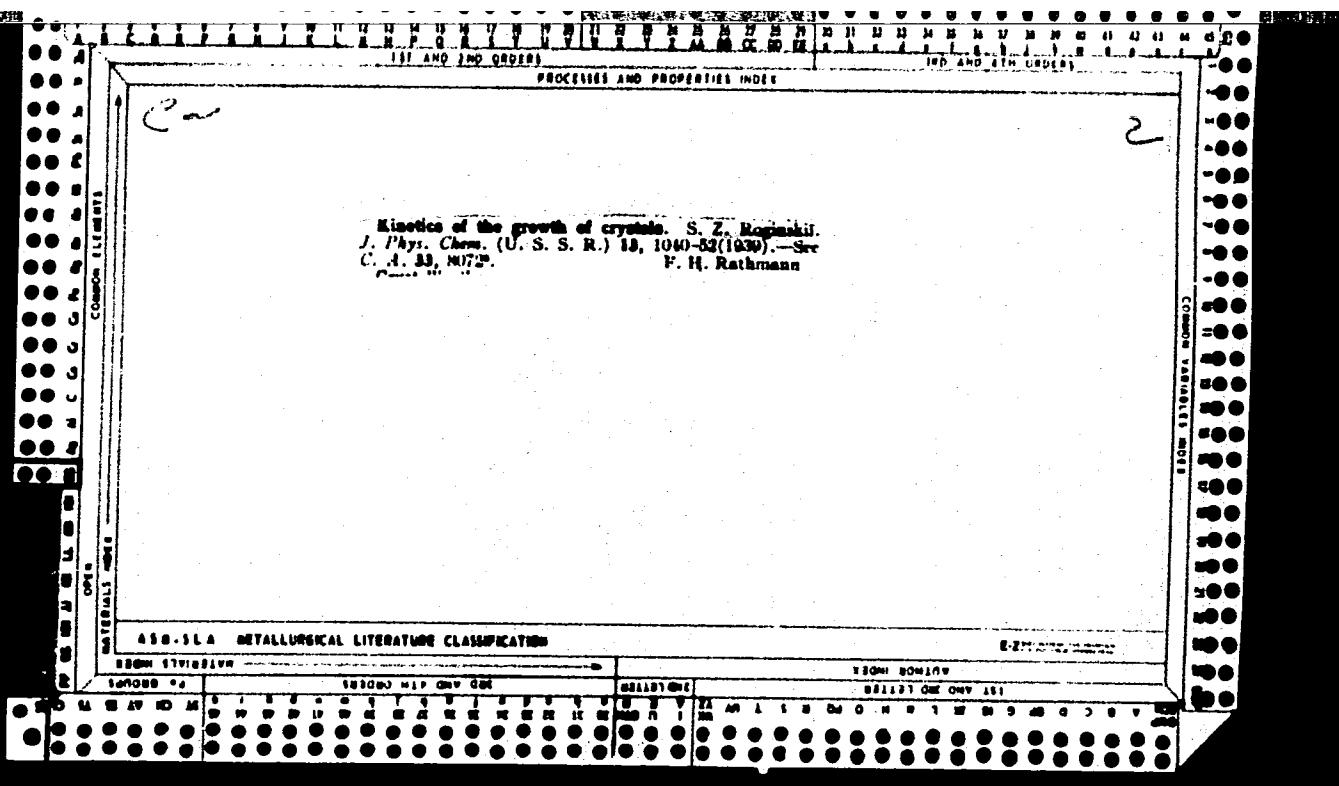
EXTRACTS FROM

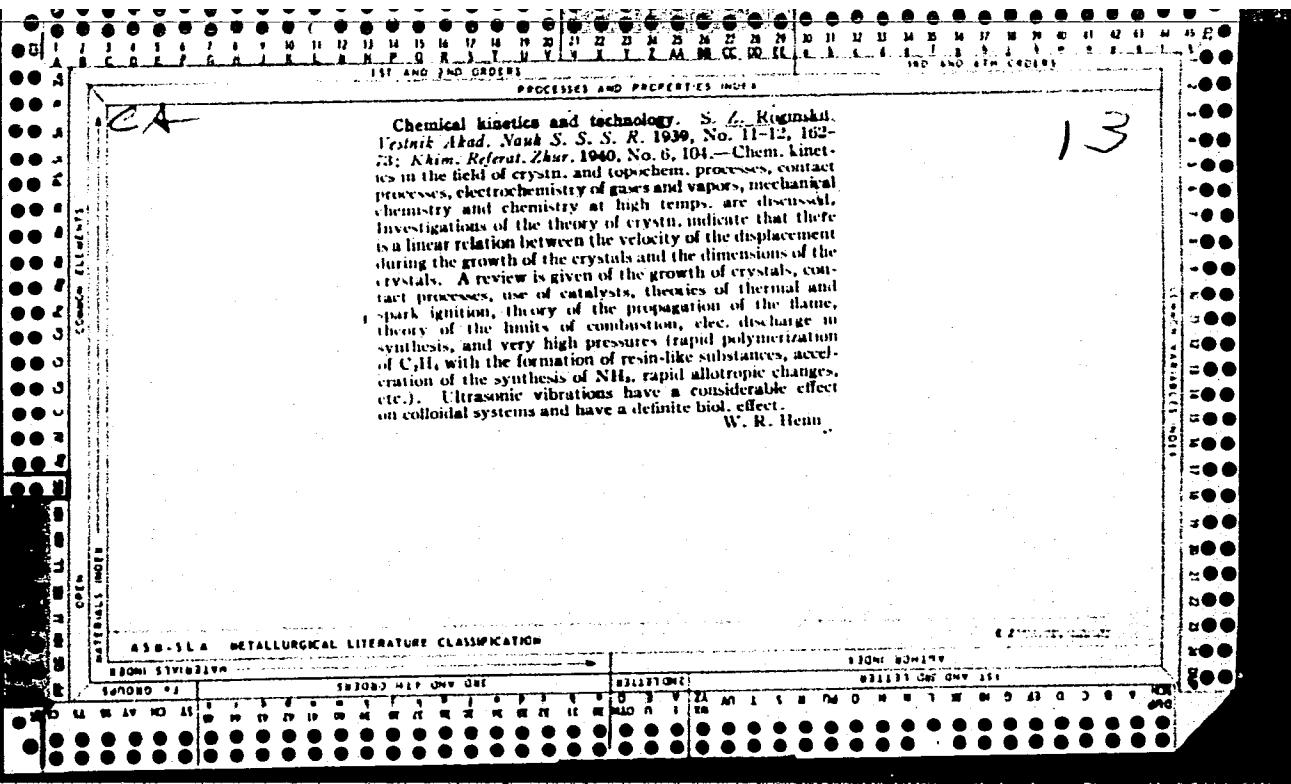
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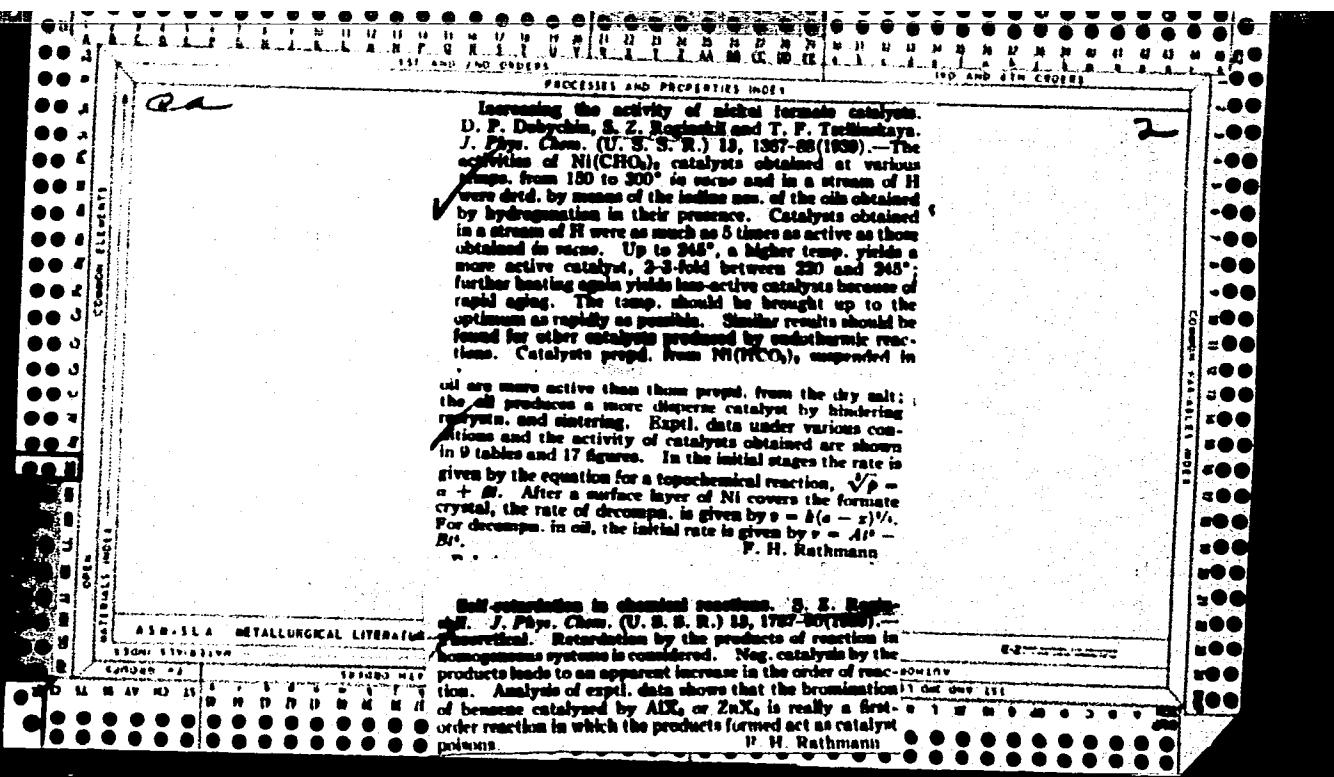


1ST AND 2ND ORDER		3RD AND 4TH ORDER	
PROCESSES AND PROPERTIES INDEX			
<i>CJ</i>		2	
<p>The nature of the catalytic activity of platinum. N. Z. Mandel'son and V. B. Rostov. <i>Uchrenye Zapiski Leningrad. Gosudarstv. Univ., Ser. Fiz. Nauk</i> 1959, No. 5 (No. 38); 67-72; <i>Khim. Zhurn.</i> 1960, No. 4, 8.—Previous investigations showed that the catalytic activity of Pt increases during the reaction of H with O. Attempts were made to discover analogous phenomena in other systems by studying the reaction of H with O on Pt. The catalytic activity of Pt increases under the influence of the mixt. The activation curve is expressed by <math>dv/dt = A(A - x)^{1/2} \sqrt{t}</math> (<math>A</math> is the initial pressure of the gas mixt, and <math>x</math> the amt. of the substance that undergoes reaction). H alone inactivates Pt; O increases its catalytic activity at 430°. After removing O from the surface of Pt by means of H the Pt surface is inactivated, but treating it with the mixt. of the two gases rapidly restores the initial activity. The results indicate that O atoms or sub. imbedded in the porous Pt lattice are the active centers on the surface of Pt. — W. B. Hearn</p>			
AIA-51A METALLURGICAL LITERATURE CLASSIFICATION			
E-Z FILE CLASSIFICATION			
MATERIALS INDEX		ECON. BONNIV	
SUBJECT INDEX		GENERAL INDEX	
TECHNO. HANDBOOKS		GENERAL INDEX	
* GROUP I		* GROUP II	
14	15	16	17
18	19	20	21
22	23	24	25
26	27	28	29
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## PROCESSES AND PROPERTIES INDEX

~~CONFIDENTIAL~~

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27

**Intensification of the process of hydrogenation of fats.** D. Dobychin and S. Roginskii. *Makrobiol. Zhurn.* **Dokl.** 15, No. 6, 13-15 (1957).—The rate of hydrogenation can be considerably increased if the stirring is increased to 3000 revolutions/min. and the activity of the Ni catalyst is enhanced by reduction of  $\text{Ni}(\text{CO}_4)_2$  in oil at the possible min. of time. The optimum conditions for reduction are conducting H<sub>2</sub> at a rate of 300-500 l./min. per 1 kg. Ni and raising the temp. to 200° in 17 min. and holding at 200-40° for 1 hr. Chas. Blane

1100

## **ASIA-SEA METALLURGICAL LITERATURE CLASSIFICATION**

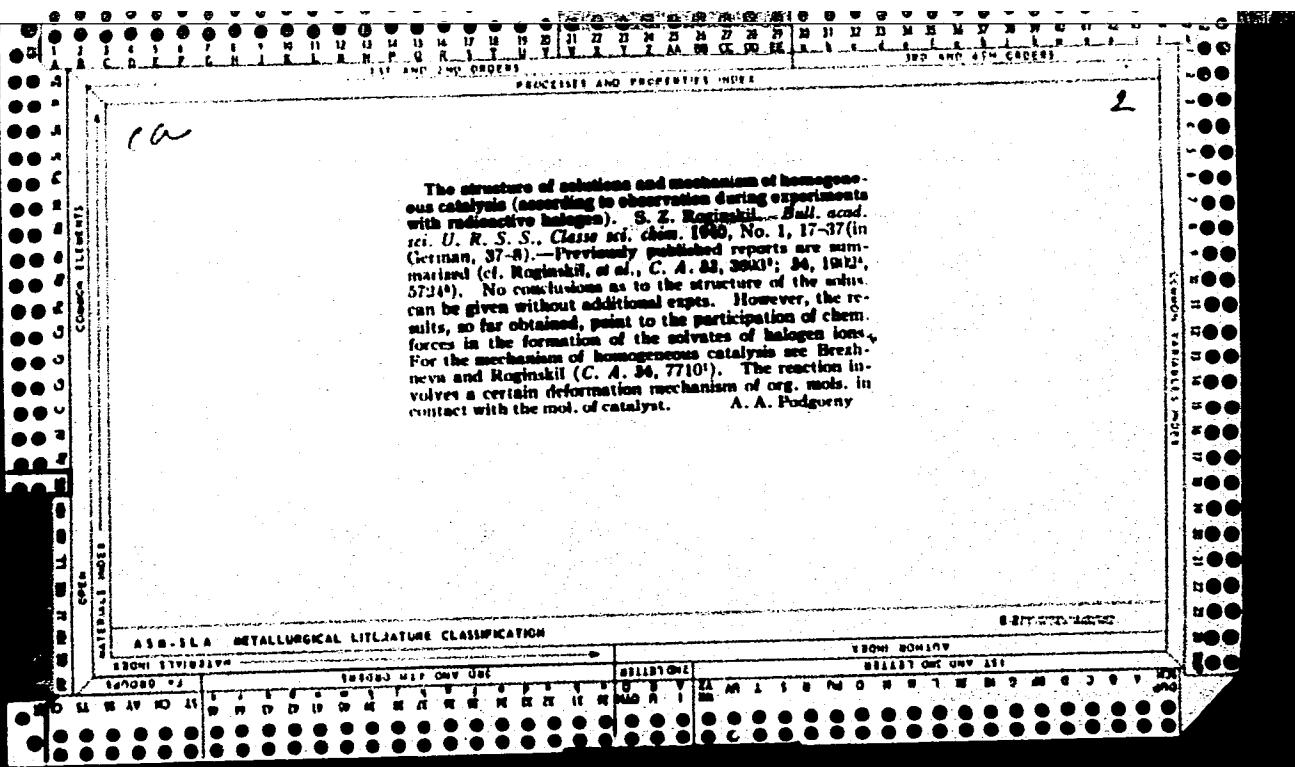
卷之三

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014451

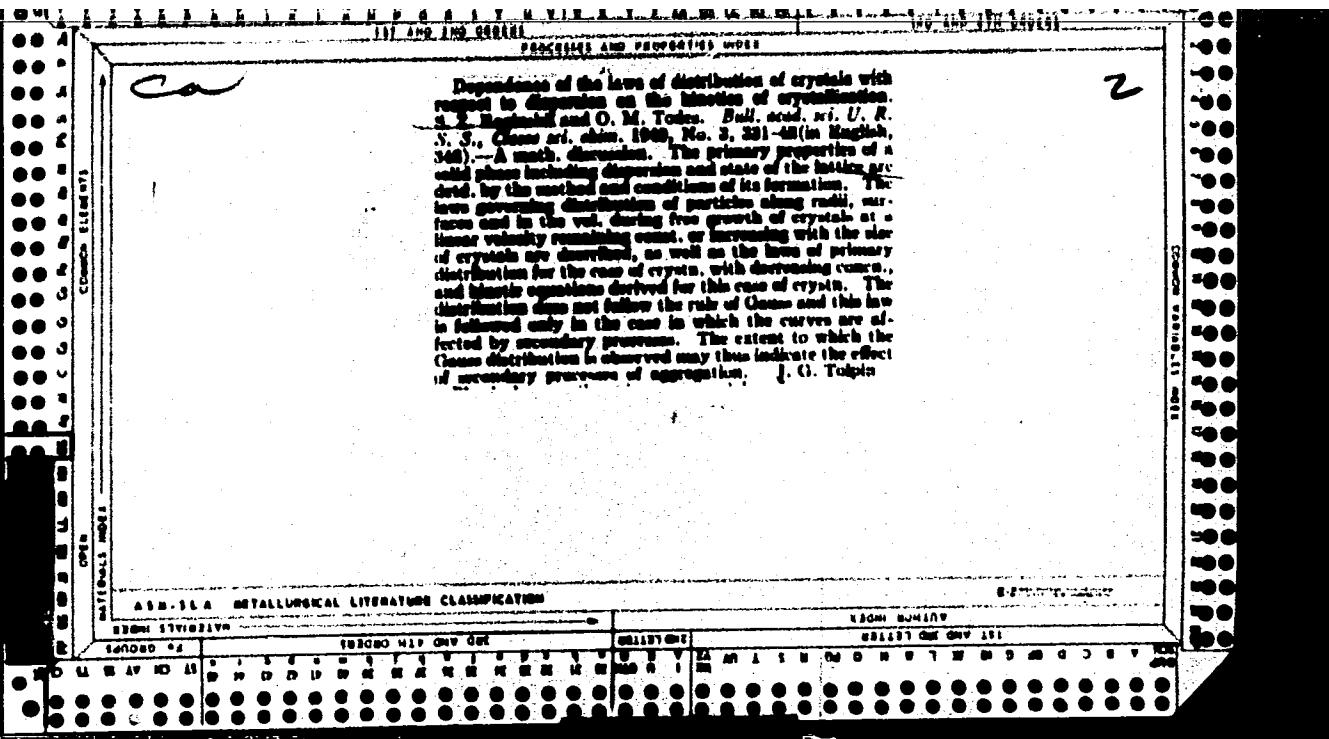
Investigation of interhalide exchange of bromine ions in various solvents. S. Z. Bogushikh and V. E. Tartakowskaya. *Comp. rend. acad. sci. U. R. S. S.* 24, 709-11 (1950) (in English).—Radioactive halogens were used as indicators in studying the p.p.m. of Ag halide salts from eq.-al. solns.; an unequal rate of p.p.m. of the halogen ions was found. The conditions necessary for the effect to appear are (1) slowness of interhalide exchange, (2) presence of substances that react in different ways with solvate ions of the 3 different types, (3) slowness of the isotopic exchange between the products of (2) and the initial substance in *solv.* The effect of the lag in inter-solvate exchange was observed in the following systems: (a) EtOH-water, (b) acetone-water, (c) glycerol-water, (d) glycerol-acetone and (e) MeOH-water. Pos. effects were also reported in the p.p.m. of soln. of  $Hg^{++}$  ions. The effect has a purely kinetic character (the velocity differs from system to system) and disappears if the soln. is kept at room temp. for a long period of time. The period was found to be shortened by raising the temp. or by the addition of acid. The authors believe that the magnitude and the stability of the effect point to an existence of solvates constg. made of only one of the solvents in the envelope surrounding the ions.

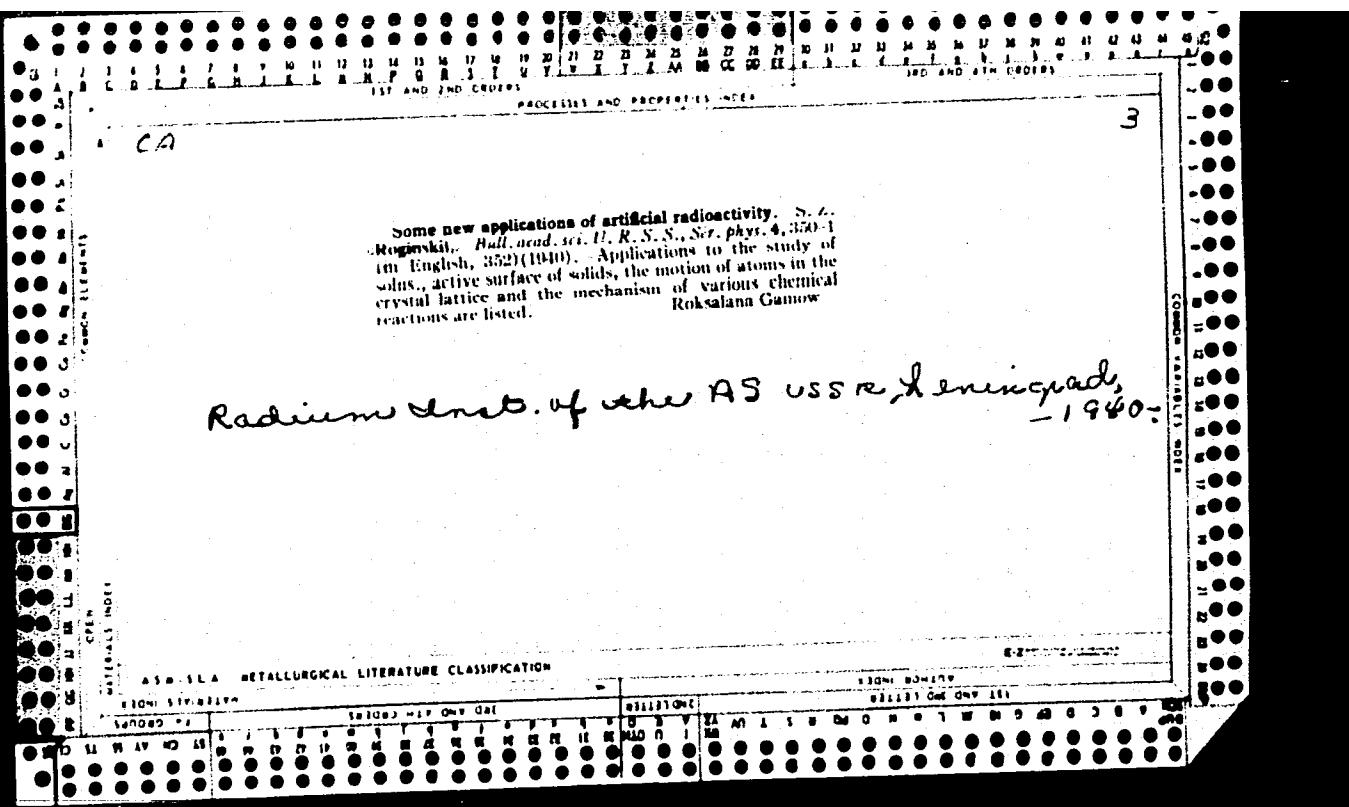
Frank Colet

**APPROVED FOR RELEASE:** Tuesday, August 01, 2000      **CIA-RDP86-00513R0014451**



**Dependence of the laws of distribution of crystals with respect to dimension on the kinetics of crystallization.** S. I. Bagratishvili and O. M. Tolpitsa. *Bull. Acad. sci. U. R. S. S., Classe sci. chim.* 1959, No. 3, 321-340 (in English, 342). A math. discussion. The primary properties of a solid mass including dimension and state of the lattice are derived, by the method and conditions of its formation. The laws governing distribution of particles along radii, surfaces and in the vol. during free growth of crystals at a linear velocity remaining constant or increasing with the size of crystals are described, as well as the laws of primary distribution for the case of crystals with decreasing concern, and kinetic equations derived for this case of crystals. The distribution does not follow the rule of Gauss and this law is followed only in the case in which the curves are affected by secondary processes. The extent to which the Gauss distribution is observed may thus indicate the effect of secondary processes of aggregation. J. G. Tolpitsa

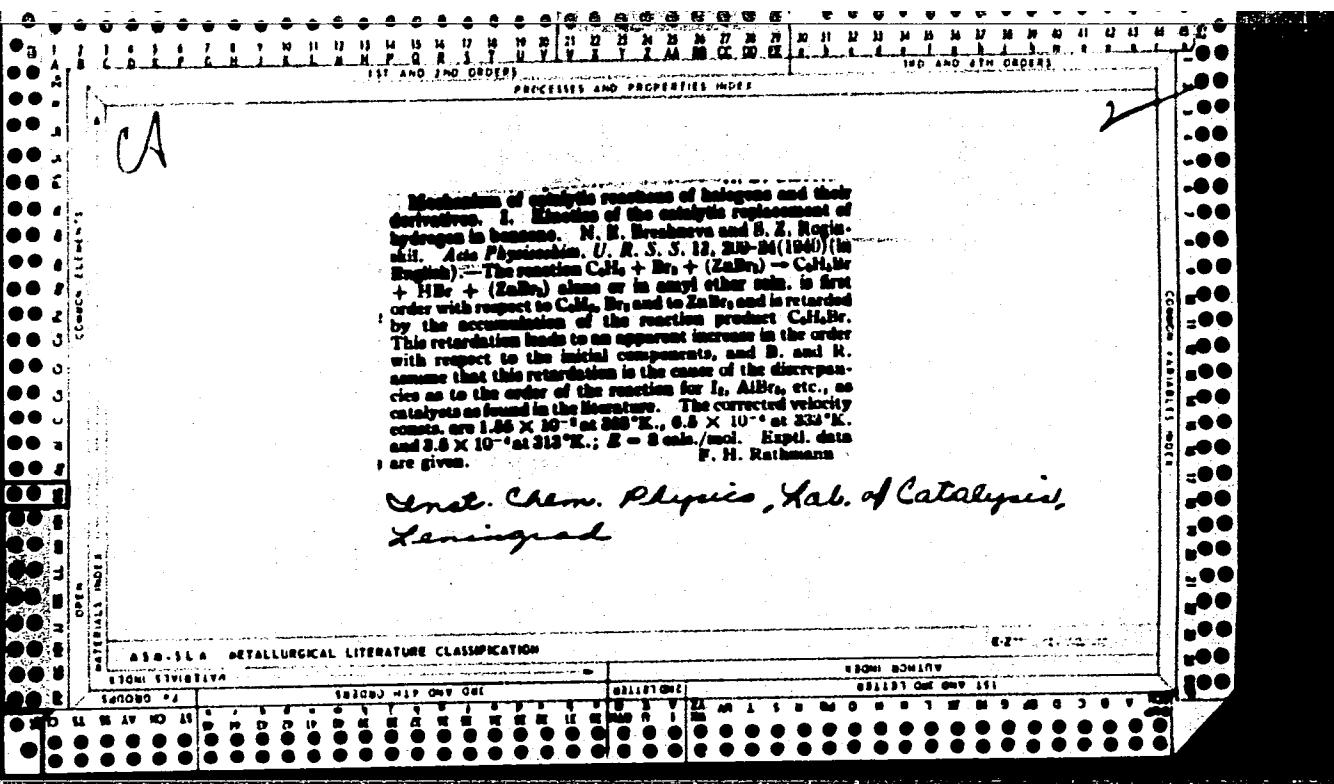




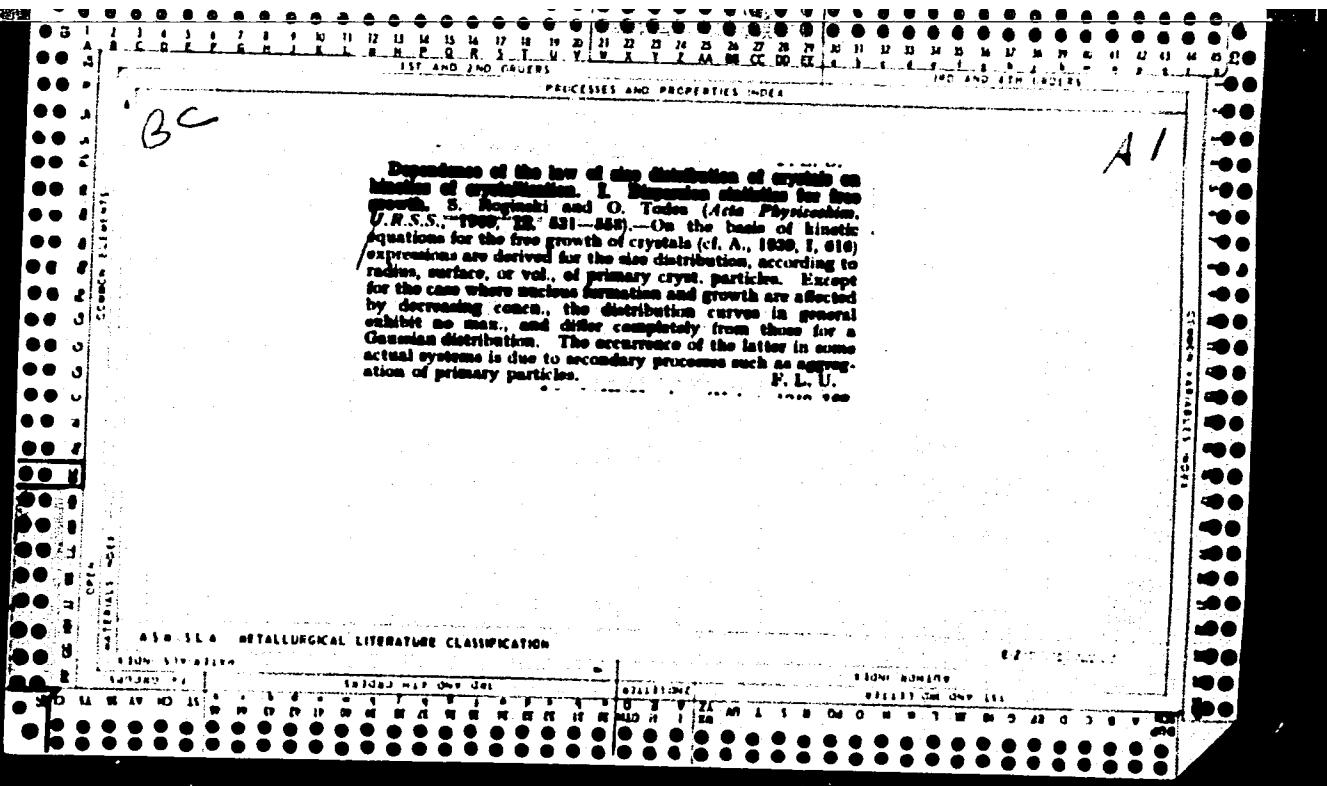
**Nuclear reactions.** S. Z. Roginskii. *Uspokhi Khim.*, 9, 1217-51(1940).—Review covering elementary particles, structures and properties of heavy at. nuclei, the drop-model of the nucleus, nuclear processes, energy radiated by radioactive substances, forced nuclear processes, the general and kinetic laws of nuclear reactions, methods for directing nuclear reactions and the kinetics of these forced reactions, and especially the kinetics of reactions involving neutrons.

F. H. Rathmann

AS RELEASED METALLURGICAL LITERATURE CLASSIFICATION

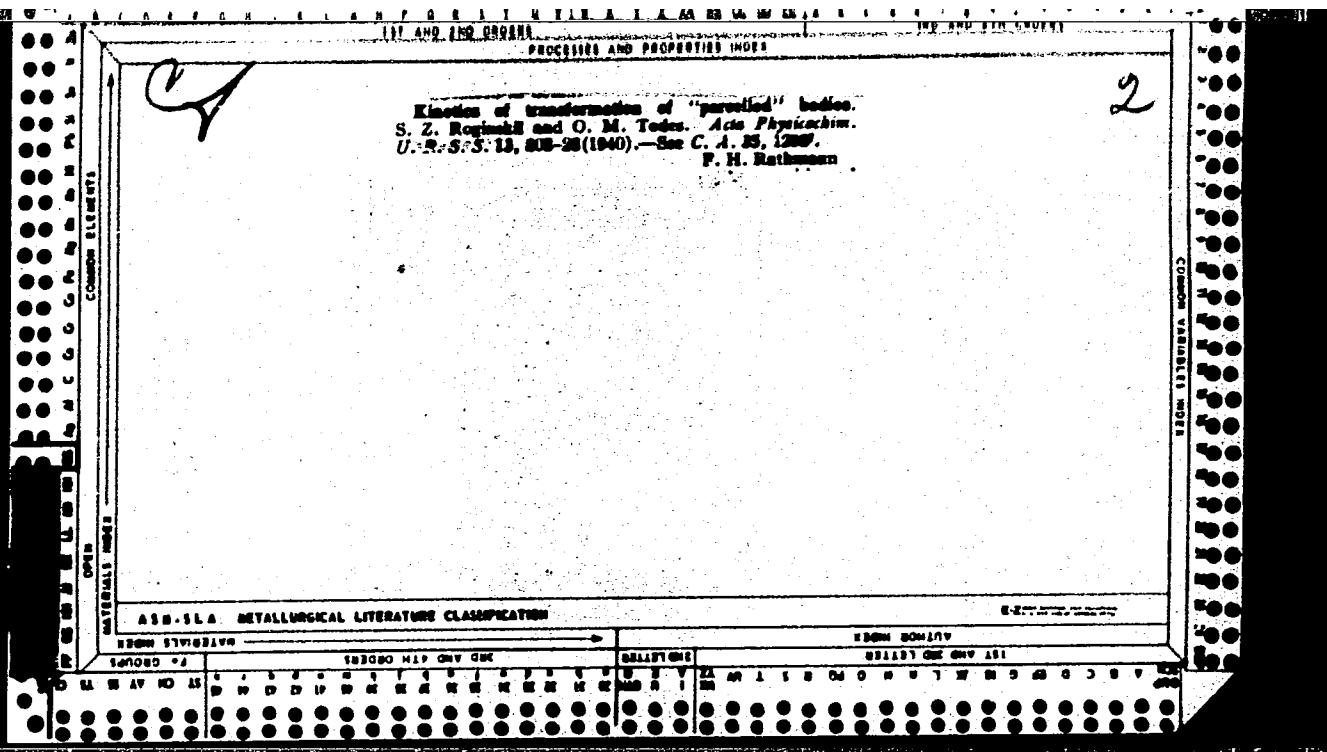


1ST AND 2ND ORDERS	3RD AND 4TH ORDERS
<p><i>Ca</i></p> <p>Kinetics of the transformations of particulate substances. S. Z. Roginskii and O. M. Toul. <i>Bull. acad. sci. U. R. S. S. Chern. chim.</i> 1949, 475-90 (in English, 1951).—The object of the expts. was to det. the effect of the resolution of a phase into separate particles on the kinetics of chem. reactions and aggregate transitions. For slightly dispersed substances the presence or absence of nucleation is very important in detg. the character of the course of the transformation with time. The relation between the topography of nucleation and the av. time necessary for a nucleus to originate in a particle, the av. time for the process to pass through the particle and the av. time required for the contact of the reaction zones separating from individual centers also are important. For any process connected with nucleation (when the particle size is sufficiently small) the av. time of nucleation becomes considerably larger than that required for the reaction to pass through the particle. Under these conditions all the processes are of the 1st order and proceed with an initial general rate that decreases with decrease in the no. of particles. The exponent in the relation between the total rate and the no. and size of particles is detd. directly by the topography of nucleation. Rate equations were obtained for several curves representing the distribution of particles according to size. The processes taking place over the entire surface of the particle and the processes requiring nucleation are analyzed. The effect of the degree of uniformity and the range of dimensions is pointed out. As a rule the monodisperse materials disintegrate at first more rapidly than do the polydisperse materials whose largest particles are the same as those of the monodisperse material in dimensions. Toward the end, the disintegration process becomes slower.</p>	
<p style="text-align: right;">2</p> <p>ASG-SLA METALLURGICAL LITERATURE</p> <p>X39041 511632140</p> <p>SEARCHED <input checked="" type="checkbox"/> SERIALIZED <input checked="" type="checkbox"/> INDEXED <input checked="" type="checkbox"/> FILED <input checked="" type="checkbox"/></p> <p>W. R. Henn</p> <p>SEARCHED <input checked="" type="checkbox"/> SERIALIZED <input checked="" type="checkbox"/> INDEXED <input checked="" type="checkbox"/> FILED <input checked="" type="checkbox"/></p>	



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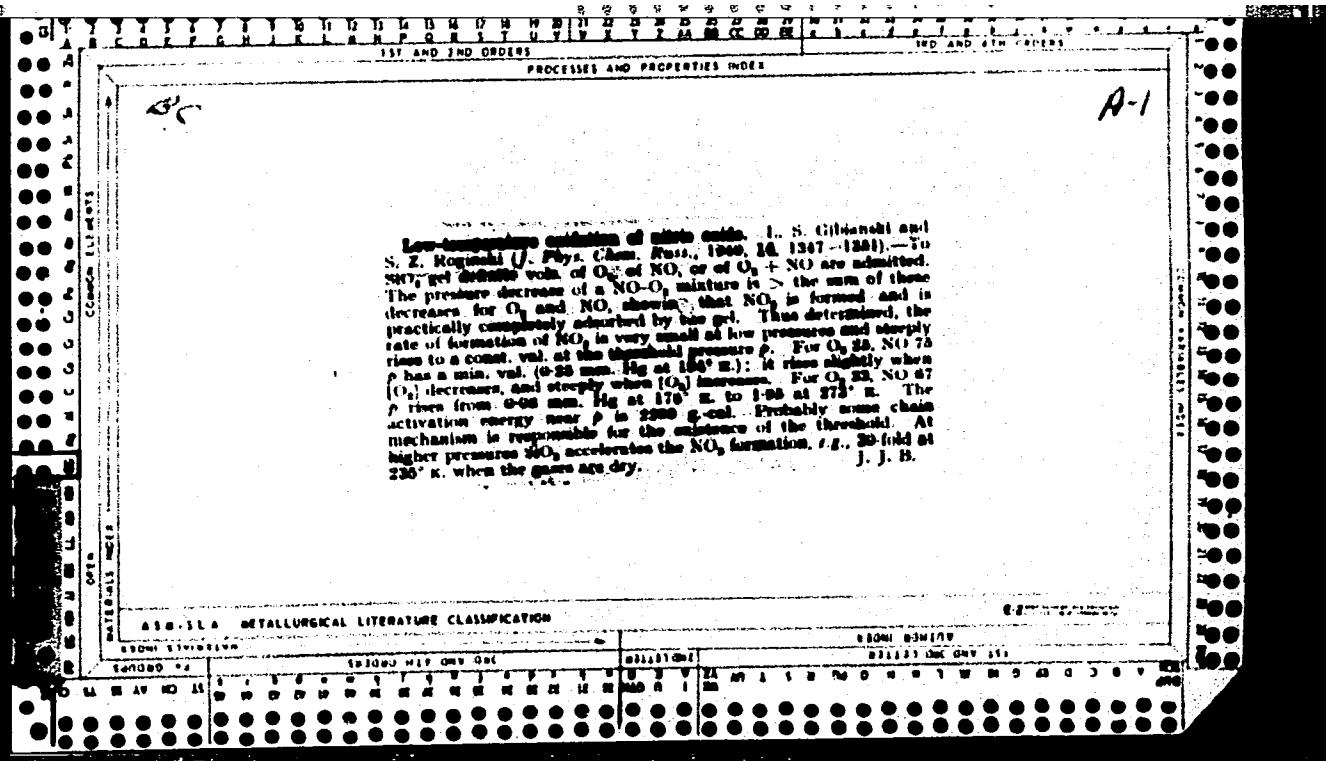
1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									
PROCESSES AND PROPERTIES INDEX										COMPUTER INDEX									
Kinetic principles of the method of isotopic indicators.																			
1. Kinetics of exchange reactions. S. Z. Karginov. Bull. Acad. sci. U. R. S. S., Class. sci. chm., 1940, 107-115 (in English, 610).—As a rule the course of isotopic exchange processes with time obeys the law governing unimol. reactions. The principal methods by which the mechanism of the isotopic exchange can be derived from kinetics are indicated. It is possible to use the effect of the initial conditions upon the const. rate of the 1st order for detn. of the product of the activity coeff. of the solns. and the adsorption isotherms and isobars for contact reactions. The limits within which the reaction obeys the unimol. law and the significance of the deviations from it for a study of the recrystn. processes are pointed out. The exptl. data agree with the results of kinetic analysis. The transition of para-H to ortho-H on glass and quartz was investigated fully. The reaction is strictly unimolecular. The dependence of the velocity const. on the initial pressure and temp. shows a complex adsorption mechanism of the transfer. A law governing the equidistribution of isotopes for complex heterogeneous systems was derived. The formulated kinetic conclusions do not hold true (1) for exchange during transfer, (2) for heterogeneous isotopic exchange with the surface undergoing changes owing to recrystn., poisoning, etc., (3) for exchange under conditions of diffusion which limit completely or partially the velocity of the summary process, and (4) for reactions that take place nonisothermally. Ten references.																			
W. R. Henn																			
TRANSLATED FROM <i>Zhur. Khim. Fiz.</i> , No. 5, 1940, p. 1071.																			
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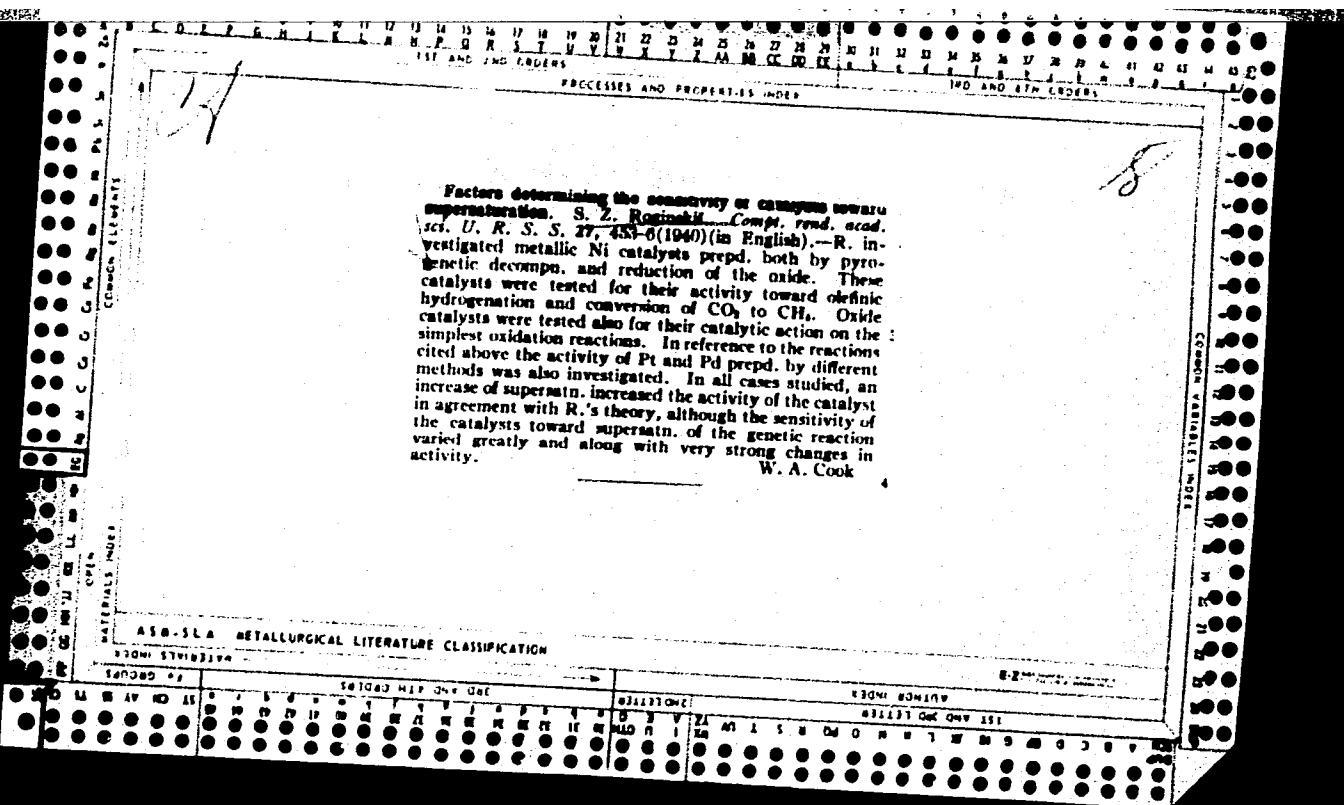
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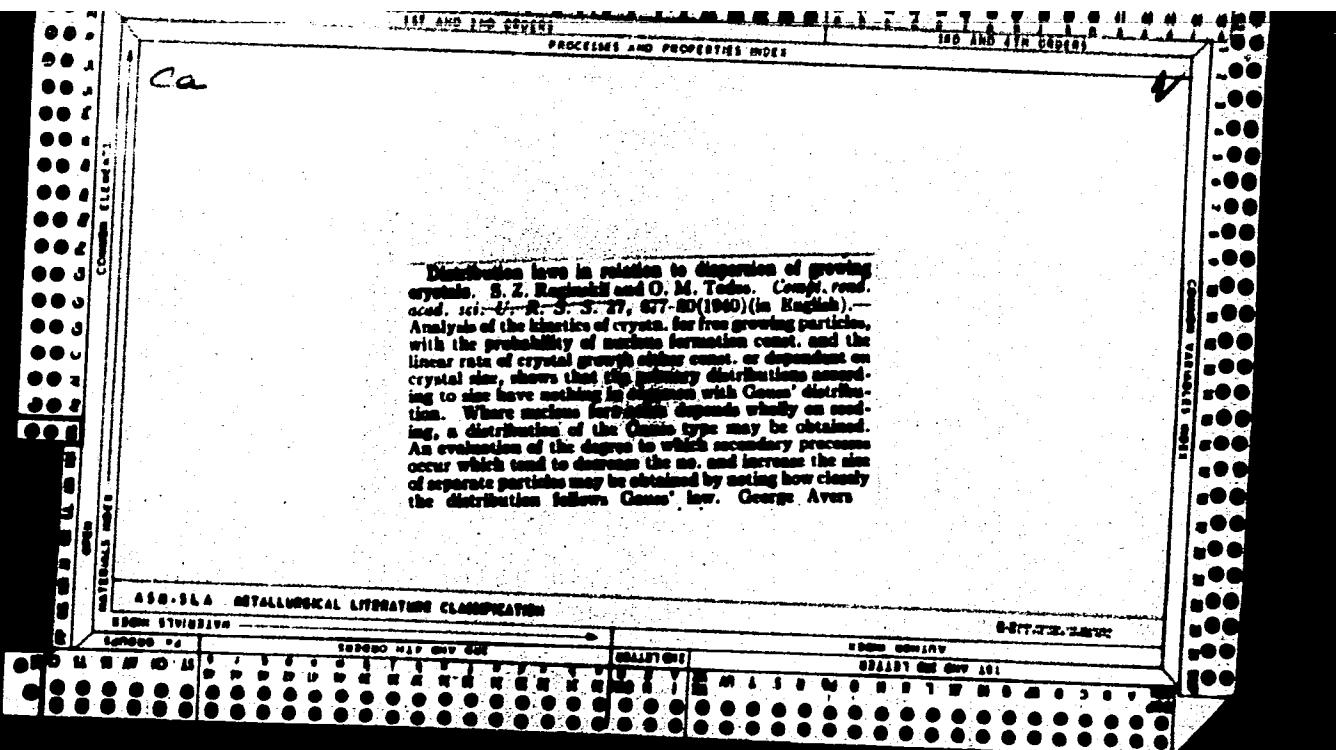
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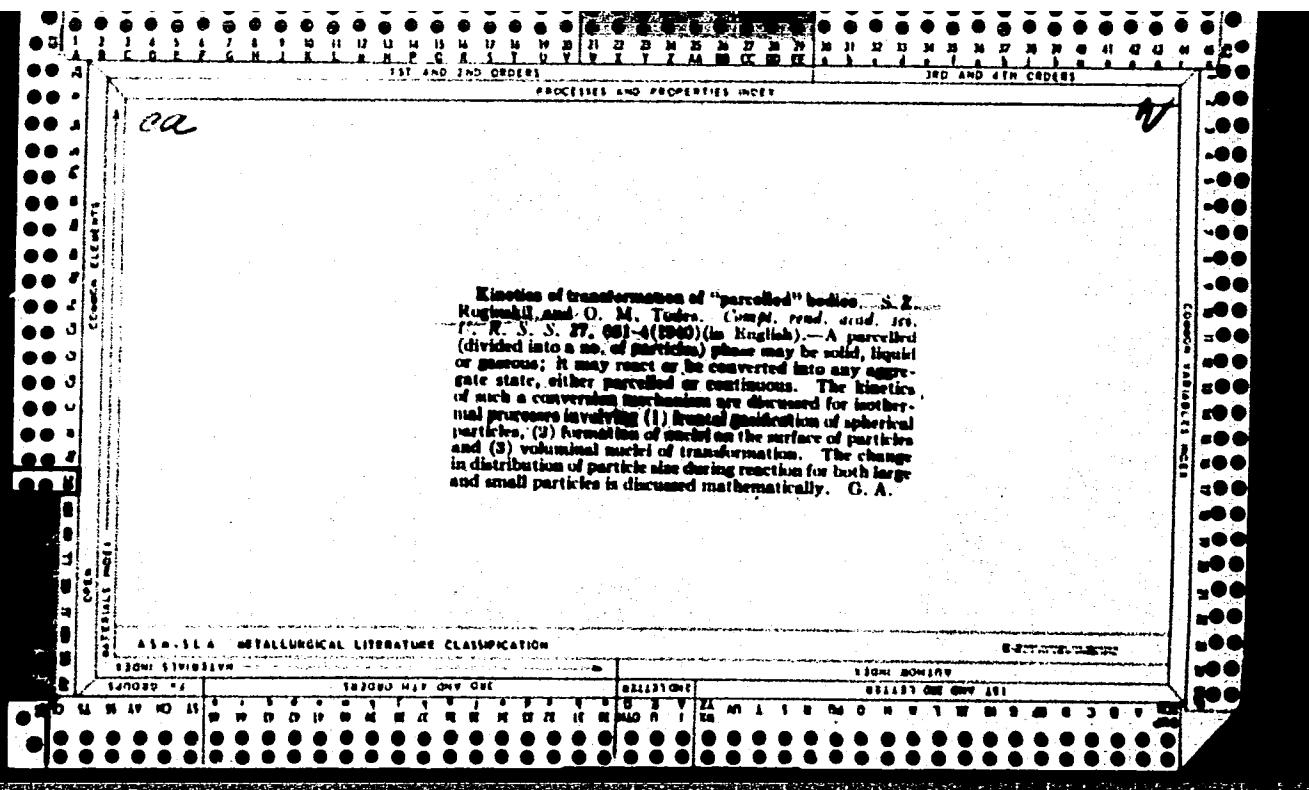
Mechanism of catalytic reactions of halogeno and their derivatives. I. Kinetics of the catalytic displacement of hydrogen in benzene. N. E. Bresheva and S. Z. Reginishi (*J. Russ. Chem. Russ.*, 1960, **10**, 69-87).—The initial rate of consumption of Br in a solution of Br and  $ZnBr_2$  in  $C_6H_6$  or in  $C_6H_6\text{-}H_2O$  at 0° or  $[ZnBr_2][C_6H_6]^{1/2}$  values from 1 to 30 g., [Br] from 3 to 10 g., and  $[C_6H_6]$  from 25 to 100 c.c. per 100 c.c. of solvent. In later stages the apparent reaction coeff. decreases. This decrease is due to an inhibition by  $PbBr_2$ ; in a mixture of  $C_6H_6$  15,  $PbBr_2$  85 the reaction is 18-180 times as slow as in a mixture of  $C_6H_6$  15, amyl ether 85 and is strictly unimol. After correction for the effect of  $PbBr_2$  the reaction coeff. is  $1.3 \times 10^4$ ,  $6 \times 10^4$ , and  $3.3 \times 10^4$  at 0°, 60°, and 10°, respectively; the activation energy is 4000 kcal. The inhibiting effect of  $PbBr_2$  is probably due to formation of a complex with  $ZnBr_2$ .

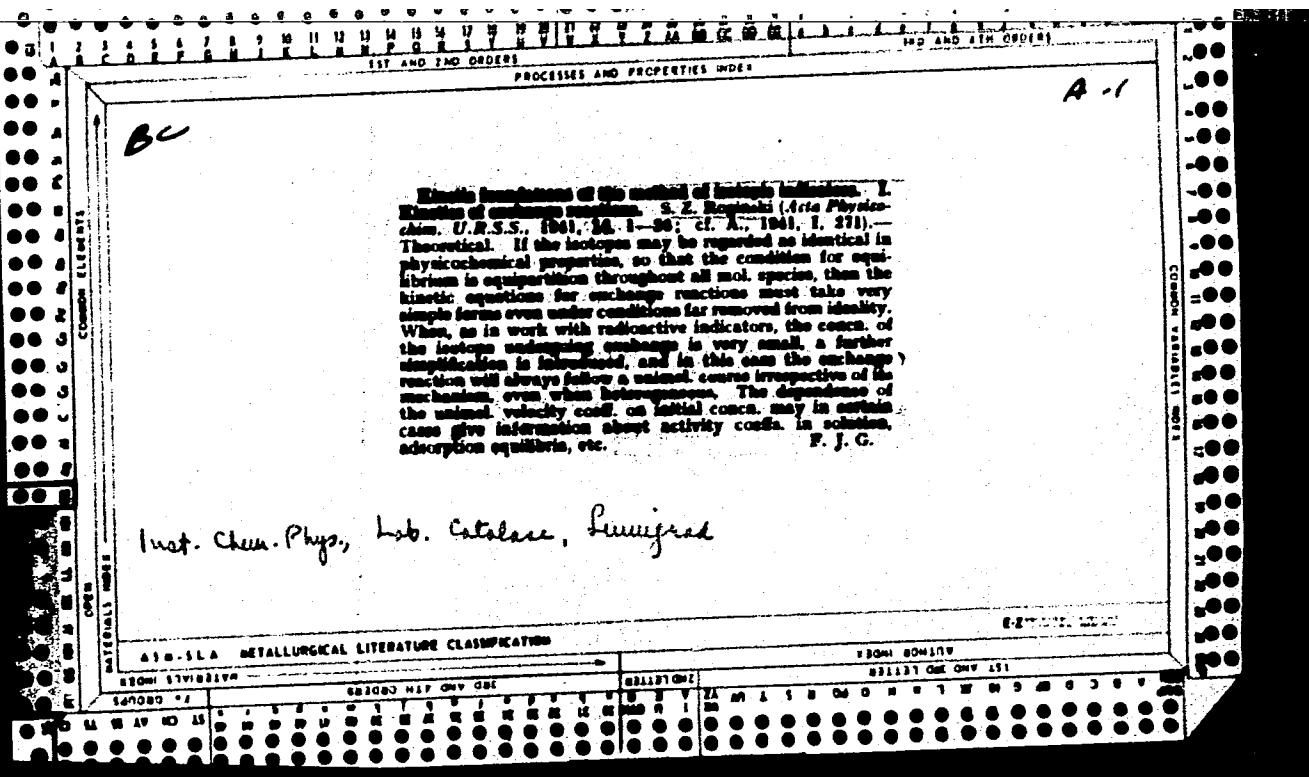


"Kinetics of Intersolvate Exchange," Dok. AN, 26, No. 4, 1940.  
Insti. of Chem. Physics, Leningrad, c 1940-.









#### **PROGRAM AND PRACTICE INDEX**

**Active centers, their formation and nature.** I. Nature of active centers. S. Z. Rosenthal. *J. Phys. Chem.* (U. S. S. R.) 15, 1-30 (1941).—Theoretical. Previous exptl. data are discussed. The phys. theory of active surfaces ascribing the determining role in catalysis to phys. inhomogeneities and phys. destruction of normal structure is homogeneous. Chem. factors such as the presence of impurities and deviations from stoichiometric proportions are important factors for the appearance of catalytic activity in metals and oxides. The activation of Pt and Pd catalysts by evacuation and treatment with various gases, especially  $O_2$ , is discussed. The adsorbed O atoms are not on the surface but just beneath the upper layer of metal atoms, and decrease the work of removal of atoms from the surface. When highly dispersed metals are completely degassed they become inactive; all pure metals are also completely inactive with respect to the hydrogenation of ethylene; all *active* catalysts are in reality mixed catalysts. The activity increases exponentially with the extent of impurity up to a sharp max., the sharper the lower the temp. The ap. surface of catalysts is practically unchanged by treatment with gases but the rate of activated adsorption is greatly increased. On the assumption that there is a continuous change of the heat of adsorption with the concn. of the oxidant, a theory is developed according to which a min. heat of activation and a max. velocity of reaction are obtained for a certain concn. of impurity. It is assumed that the best promoters are minute amounts of catalyst poison. An analogy between the precipitating action of poisons and certain blocking phenomena is indicated.

P. H. Rathenau

## **AMERICAN METALLURGICAL LITERATURE CLASSIFICATION**

AUTOMOBILE

**APPROVED FOR RELEASE: Tuesday, August 01, 2000**

CIA-RDP86-00513R0014451

Theory of preparation of catalysts. Rate of free energy. S. Z.  
Roginski (J. Russ. Chem. Soc., 1941, 18, 708 - 730). — Theoretical.  
R. T.

*Sc*

**Active surface of metallic catalysts.** S. Roginskii (compt. rend. Acad. Sci. U.R.S.S., 1941, **50**, 23-25).—Films of Pt, Pd, Fe, Ni, and W, produced by condensation of metallic vapours in complete absence of gaseous admixtures, are inactive for catalysis of the oxidation of H<sub>2</sub> and the hydrogenation of C<sub>2</sub>H<sub>2</sub> at low temp. Introduction of gases (e.g., N<sub>2</sub>, H<sub>2</sub>, O<sub>2</sub>, or org. vapours) at the moment of condensation imparts to the films a high catalytic activity which increases exponentially with the amount of gas added, up to a limiting val. Degassing destroys the activity. L. J. J.

**Activation, desorption, and regeneration of powdered metal.** K. Aihara, S. Yamada and T. Tanabe. Compt. rend. acad. sci. U.R.S.S., 1941, **50**, 59-61 (1941) (in English).—The activity of the powder, either unpressed or powdered by N<sub>2</sub> or O<sub>2</sub>, is not due to any change in the surface of the metal. Desorption of the promoter on the metal is responsible for the effect. J. H. Reedy

**Theoretical principles of the preparation of catalysts.** I. Methods of preparation and regulation of supersaturation. S. Z. Ropashii, *J. Applied Chem. (U.S.S.R.)* 17, 3-15 (1944) (English summary); cf. *C.A.* 37, 921. Theoretical discussion of phys. and chem. principles that control supernatn. in the prepn. and use of catalysts. Suitable selections must be made for prepa. of specific catalyst masses. II. Conditions for utilization of supersaturation of reactions in the preparation of catalysts. *Ibid.* 37, 97-105.—Excess free energy (i.e., supernatn.) of the reaction in the prepn. of catalysts is the source of the catalytically active structures in the final product. A theoretical discussion shows that concn. and temp. are essential factors in the prepa. of catalyst masses. The usual methods of catalyst prepn. are classified and analyzed as to phase conditions in the course of topochemical reactions. A preliminary guide is indicated for selection of the interval during which the application of high supersatn. is most effective.

PROCESSES AND PROPERTIES INDEX

W. R. A.  
Experimental test of the rate of decomposition in the preparation of carbonyls. S. Z. Rodzicki and T. F. Tarlinskaja (*J. Phys. Chem.* Russ., 1944, 18, 477-482).—The rate  $v$  of decomp. of  $\text{NiCO}_3$  depends on the  $\text{H}_2\text{O}$  content of the specimen; for non-dehydrated specimens at 250° it gradually decreases when the degree of decomp. increases.  $\text{NiCO}_3$  specimen heated at 200-300° at 10-170 mm. Hg of  $\text{CO}_2$  and containing 20-80% of  $\text{NiO}$  loses  $\text{CO}_2$  on a further heating so that  $v$  passes through a max. at 8-18% of decomp. The max.  $v$  is the greater the lower is the  $\text{CO}_2$  pressure around the  $\text{NiCO}_3$ ; e.g., at 250° the max.  $v$  at  $8 \times 10^{-3}$  mm. Hg is 10 times that at 150 mm. Hg. The dependence of  $v$  on  $[\text{CO}_2]$  is pronounced at low degrees of decomp. (e.g., 5%) but is less definite at, e.g., 20%. At a const. temp. (200-300°) the free energy of the reaction  $v$  increases with temp. (200-300°); the apparent energy of activation is 11,000 g.-cal. per mol. The thermal decomp. of  $\text{NiCO}_3$  is a centripetal topochemical reaction. J. J. B.

ASM-SEA METALLURGICAL LITERATURE CLASSIFICATION

CA

PROCESSES AND PROPERTIES INDEX

JRP AND 1TH C60181

Experimental investigation of the role of supernatant in the preparation of catalysts. S. Z. Roginskii and T. Tsellinskaya. *Acta Physicochim. U.R.S.S.*, 19, 225-47 (1944) (in English); *J. Phys. Chem. (U.S.S.R.)*, 18, 477-92 (1944); cf. *C.A.*, 37, 821; 39, 13509e. — The pyrolytic decompr. of  $\text{NiCO}_3$  is a *cooperative topochemical reaction*. The decompr. was effected in an app. in which the  $\text{CO}_2$  pressure ( $p_r$ ) was controlled by freezing out  $\text{CO}_2$  in a cryostat maintained at various temps. The supernat. ( $A$ ) of the genet. reaction is defined as  $A = RT \ln(p_r/p)$ , in which  $p_r$  is the equil. pressure of  $\text{CO}_2$  at the surface of the solid. The decompr. of  $\text{NiCO}_3$  is auto-catalytic; the reaction velocity increases with increasing supernat. This decompr. is extremely rapid at  $\text{CO}_2$  partial pressures of  $10^{-4}$  to  $10^{-3}$  mm. of Hg; near the equil. pressure the decompr. is slow. The rate const. varies exponentially with the temp. The apparent activation energies for the decompr. are 11,000 cal./mole for

$\Delta F = \text{const.}$ , 17,000 for  $p_{\text{CO}_2} = 3 \times 10^{-4}$  mm., 15,000 for  $p = 3$  mm., and 11,000 for  $p = 10$  mm. Up to its max. the reaction velocity obeys an approx. quadratic law; hence the process involves primarily the development of formerly existing initiation centers, as is true for the decompr. of Ni-formate (cf. *C.A.*, 38, 879). The values of the reciprocal of the times needed to attain a definite degree of decompr. increase almost linearly with the supernat. A plot of velocity or % of decompr. shows a max. for each temp. and  $\text{CO}_2$  pressure; this max. is at 5-10% decompr. and is only slightly dependent on the exptl. conditions. The water content of the sample of  $\text{NiCO}_3$  has a peculiar and as yet unexplained effect on the kinetics of the decompr. T. H. Dunkelberger

## A50-11A METALLURGICAL LITERATURE CLASSIFICATION

EXTRACTED SUBJECTS

EXTRACTED SUBJECTS&lt;/

二〇

Method of deriving statistical relations in the field of surface phenomena and its applications to adsorption problems. S. Z. Ruggishii. *Compd. rend. acad. sci. U.R.S.S.* 45, 61-4 (1944).—The forms of the functions  $\theta(Q)$  and  $\rho(Q)$  are considered, where  $\theta$  is the fraction of surface covered for surface patches on which the heat adsorption =  $\beta$ , and  $\rho(Q) = d\theta/dQ$  is the distribution function for such patches. Relations deduced permit the approximate calculation of the distribution function from the adsorption isotherm or vice versa. H.A.

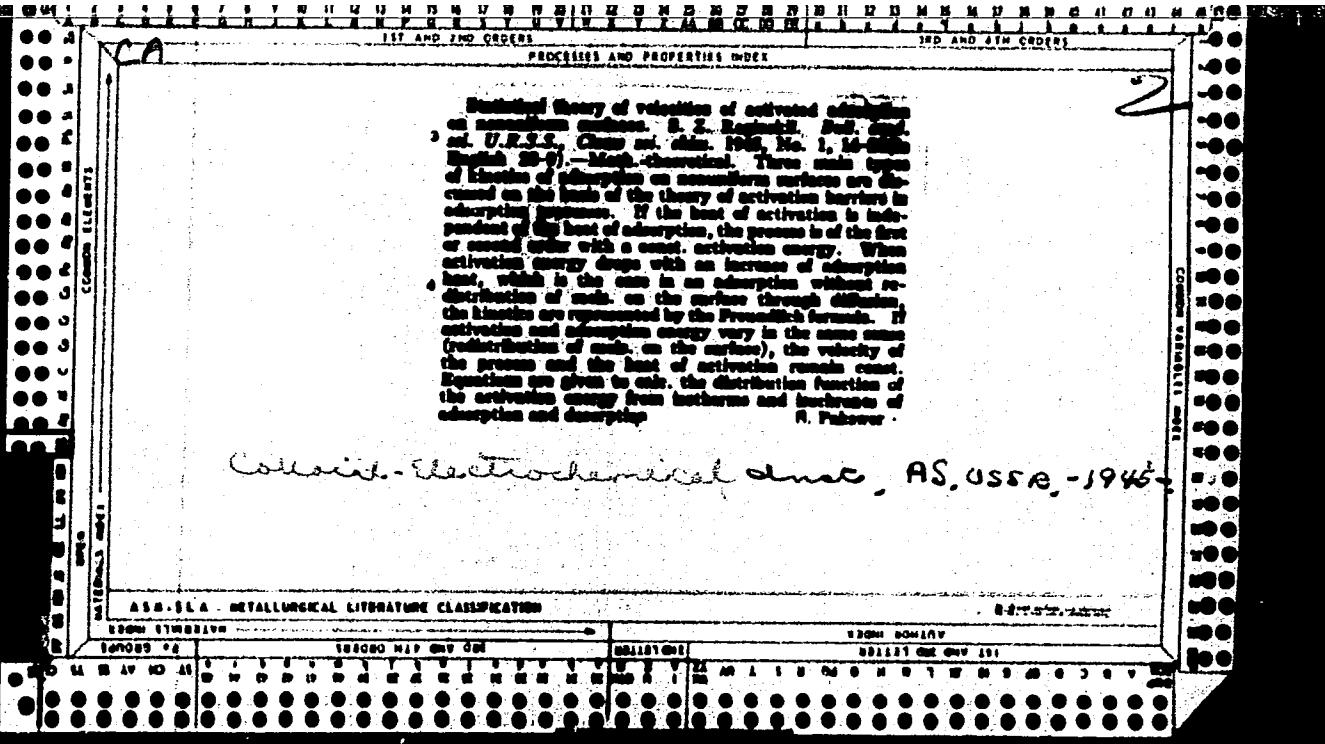
Cor. Inv. No. A.S. Lab. Catalysis, Colloids -  
Electrochemical Unit, A.S.C. 1944.

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014451

AI-5, Solutions, dispersions and  
mixtures

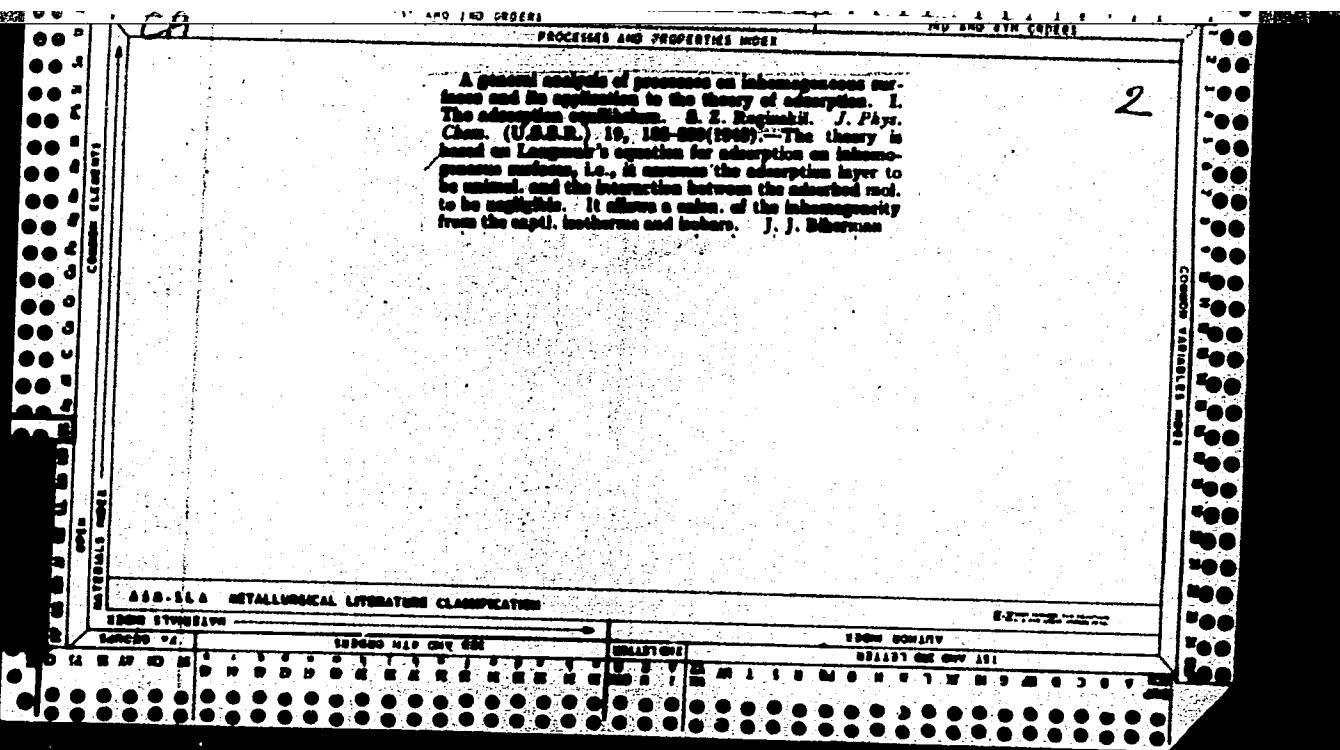
Statistical theory of adsorption isobars and isotherms for non-uniform surfaces and  
a graphical method of finding the distribution from the isotherms and isobars. S. Z.  
Rofinski (Compt. rend. Acad. Sci. U. R. S. S., 1944, 45, 194-195).--Equations previously  
developed (cf. preceding abstract--Method of deriving statistical relations in the field  
of surface phenomena, etc.) are modified so that they may be utilised directly in the  
analysis of experimental data.

S. R. R.



RÖDINKIY, S. Z.

"Electron-Microscopic Investigation of Catalysis I. Asbestos as a Carrier,"  
Iz. Ak. Nuk SSSR, Otdel. Khim. Nauk, No. 4, 1945. Colloid-Electrochemical  
Institute, Acad. Sci. of the USSR, All-Union Institute of Experimental Medicine,  
-1945-



.CA

## **PROBLEMS AND PRACTICING WITH**

CIA-RDP86-00513R001445

**Statistical theory of adsorption rates.** S. Z. Roginskij (Acad. Sci. U.S.S.R., Moscow). *Izv. Akad. Nauk SSSR, U.R.S.S.* 20, 227-40 (1945); cf. C. I., 39, 5150. Theoretical-math. In adsorption processes requiring the overcoming of activation barriers the laws of kinetics are affected by the inhomogeneity of the surface. The time  $t$  is substituted for the pressure  $p$ , and distribution functions of activation energies are calculated from exptl. equations. When there is no relation between energy of activation  $E$  and heat of adsorption  $Q$  at const.  $p$ , the kinetics follow a unimol. law and redistribution on the surface does not occur. When  $E$  and  $Q$  vary in the same sense there is redistribution of adsorbed mols. to areas with max.  $Q$  and the process has const. velocity. In the third case discussed  $E$  is falling with increasing  $Q$ . S. Pakwær

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ASB-SEA METALLURGICAL LITERATURE CLASSIFICATION

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**APPROVED FOR RELEASE:** Tuesday, August 01, 2000      **CIA-RDP86-00513R0014451**

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## PROCESSES AND PROPERTIES INDEX

1AB AND 4TH C901

**Statistical theory of the adsorption of gas mixtures.** S. Z. Roginskii and O. Todes (Acad. Sci. U.S.S.R., Inst. Collloid- and Electrochemistry, Lab. Catalysis, Moscow); *Acta Physicochim. U.R.S.S.* **29**, 307-20 (1945); cf. C.A. **40**, 11<sup>1</sup>.—Math. The statistical theory of the adsorption of gases on complex inhomogeneous surfaces by Roginskii (*C.A.* **30**, 5141) is extended to gas mixtures. Using as a basis the Langmuir isotherm, R. discusses probable relations between the heats of adsorption of different gases on the same areas of a complex surface for the cases when the adsorption forces are of different nature. The heats of adsorption may vary in like or in contrary sense or be unrelated. By the method of the detg. band, the adsorption isotherm of individual components and the total adsorption isotherm are derived for binary mixts. for the cases when the heats of adsorption vary in like sense; the adsorption isotherms of the mixts. are expressed explicitly in terms of the adsorption isotherms of the pure components. The conditions and relations governing the mutual displacement of the gases are established for the cases of heats of adsorption varying in the same sense. The effect of the temp., external pressure, and compn. of the gaseous phase on adsorption equilibria and on the po-

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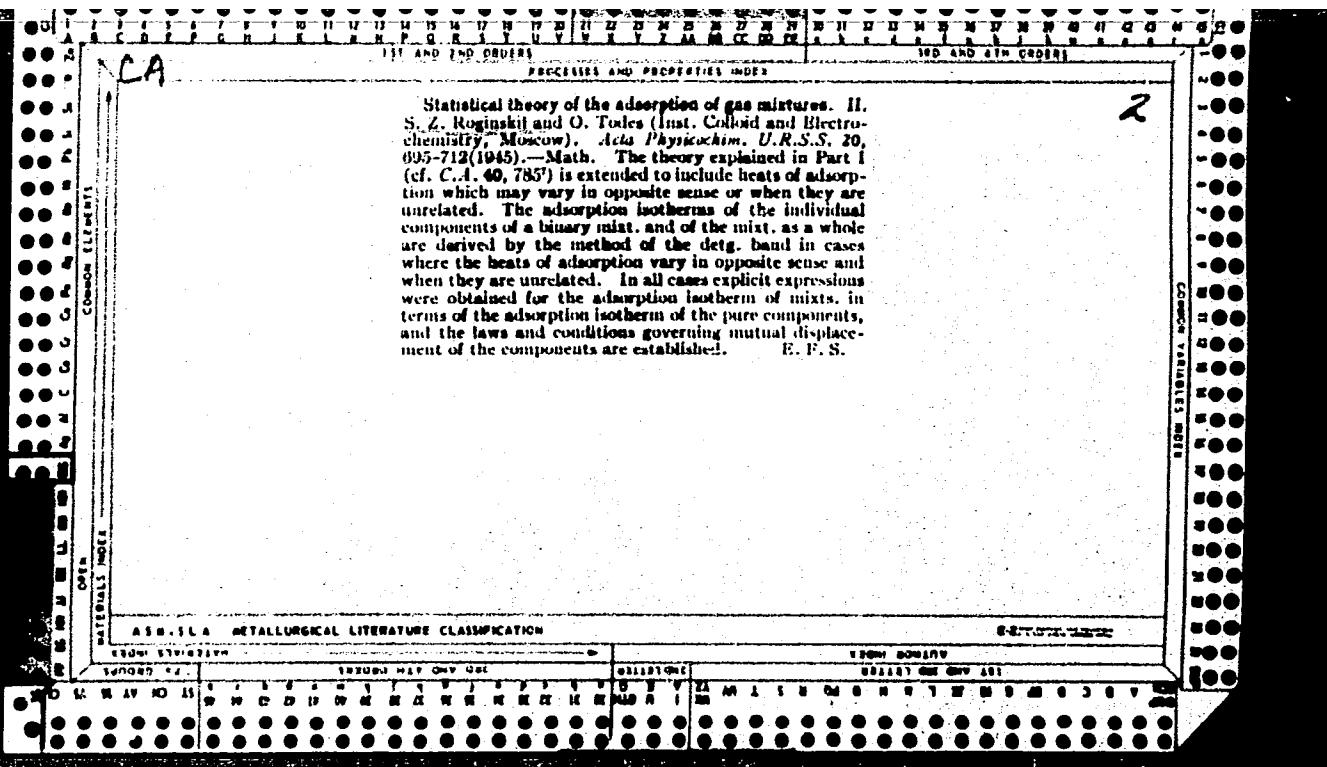
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AN-31A METALLURGICAL LITERATURE COMMUNICATION

卷之三

**APPROVED FOR RELEASE: Tuesday, August 01, 2000** CIA-RDP86-00513R0014451



ZOGINSKIY, S. Z.

"Electron Microscopical Investigation of Catalysts," Acta Phys., Vol. XX, No. 2,  
1945.

Acad. Sci. of USSR, Inst. of Colloid-and Electrochem., and Inst. of Exp. Med., Moscow  
c1945-.

BC

6-1

**Kinetics of catalysis processes on highly non-uniform surfaces.** S. Z. Roginskii (*Compt. rend. Acad. Sci. U.R.S.S.*, 1945, 67, 412-416).—Theoretical. The character of a catalytic process on a non-uniform surface is determined by the sign of the heat effect of formation of an intermediate state and by the dependence of the energy of an incompletely reversible endothermal stage on the heat of

formation of the exothermic intermediate product. Four possible cases are considered on the basis of the author's control-band method (cf. A., 1958, 8, 683; 1960). For a reaction with a broad distribution, all cases with respect to the heat of formation of the transition complex, which may or may not coincide with the activation energy, the Langmuir system of kinetic equations is replaced by a new system which includes: (i) van't Hoff kinetic equations, (ii) zero orders for two or several components, (iii) logarithmic or fractional-power increases of the quantity adsorbed with time in the case of van't Hoff dependence or complete independence of the concns. of the initial reactants, and (iv) fractional powers of the concns. of the reaction components.

#### APPENDIX B: ESTABLISHED LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: Tuesday, August 01, 2000 CIA-RDP86-00513R0014451

BC

0-1

PROCESSING AND PROPERTIES NOTE

Poisoning of catalyst. S. Z. Roginskii. *Compt. rend. Acad. sci. U.R.S.S.* 67, 478-81; *Doklady Akad. Nauk S.S.R.* 67, 497-500(1945).—Basic peculiarities of the isotherms of catalyst poisoning of broad nonuniform surfaces are discussed. Lewis J. Ross

Concentrations isotherms of catalyst poisoning. S. Z. Roginskii (*Compt. rend. Acad. Sci. U.R.S.S.*, 1945, **67**, 498-500).—The author's mathematical treatment of poisoning of catalyst surfaces (A. 1944, I, 160) is extended to derive expressions for the progress of poisoning of non-uniform surfaces (i) when poisoning begins at the least active sites, (ii) when poisoning begins at the most active sites, and (iii) in the case of a mobile "suspended" band. In (i) the effect may resemble that on a uniform surface; in (ii) a general relation applicable to all types of distribution of activity over the surface can be derived. Lewis J. Ross

AS-1000 RETRIEVAL LITERATURE CLASSIFICATION

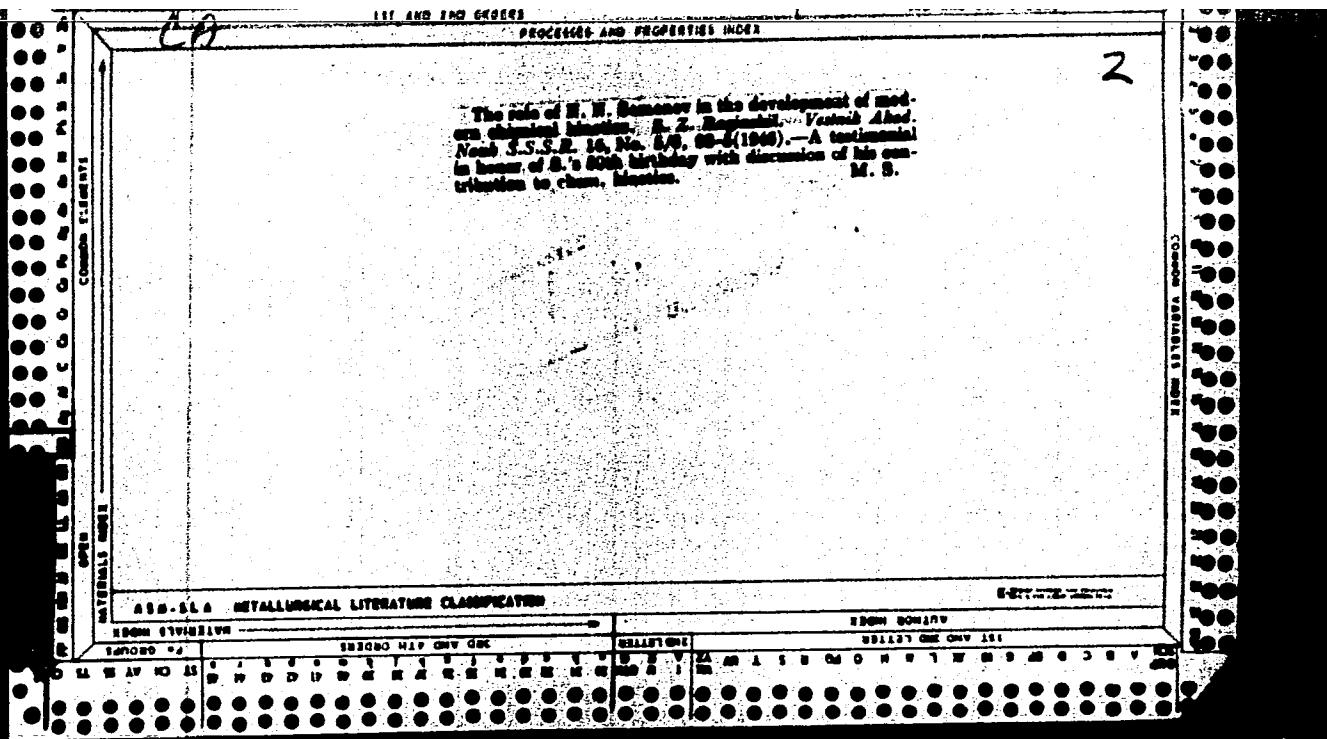
Kinetics of catalytic reactions in a flow system. I. Dynamics of processes at constant activity of the catalyst. S. Z. Roginskii and O. M. Todes. *Izv. Akad. Nauk S.S.R., Otdel. Khim. Nauk* 1946, 381-9.—(1) The starting differential equation  $\frac{dc}{dt} = - u \left( \frac{dc}{dx} \right) - kN(x)/c$  (where  $u$  = linear velocity of the gas stream;  $k$  = packing-free cross-section;  $c$  = concn. of reactant;  $x$  = distance from the entrance of the reaction space;  $N$  = no. of active centers;  $f$  = function expressing the order of the reaction;  $\delta$  = chem. reaction rate const.) is transformed into  $\frac{dc}{dt} = - u \left( \frac{dc}{dx} \right) - a(x)$  by the substitution  $a = c^{-B}$  (where  $B = \int f dx / (fc)$ ) and  $a(x) = kN(x)$ , giving for the stationary state (subscript 1)  $(x) = e^{-B'/u}$  (where  $B' = \int_0^x a(s) ds$ ), and, taking into account the initial and boundary conditions, and going back to  $c$  as variable, for the time-space distribution of the concn.: at  $t < x/u$ ,  $c(x, t) = 0$  and at  $t > x/u$ ,  $c(x, t) = c_0(x)$ , where  $c_0$  is detd. by the expression of  $a_0$  or by direct integration of the starting equation for  $\frac{dc}{dt} = 0$ . At any point of the reaction tube, at any time  $t < x/u$ , the concn. of the reactant = 0; at the moment  $t = x/u$ , the concn. wave carried by the gas stream reaches that point, and the concn. rises instantaneously and discontinuously to  $c_0(x)$  and then remains const. (2) In the case of a first-order reaction,  $f(t) = r$ ,  $r = c_0/x$ ,  $c_0(x) = r e^{-B'/u}$ , and, if the activity of the catalyst is const., i.e.  $M$

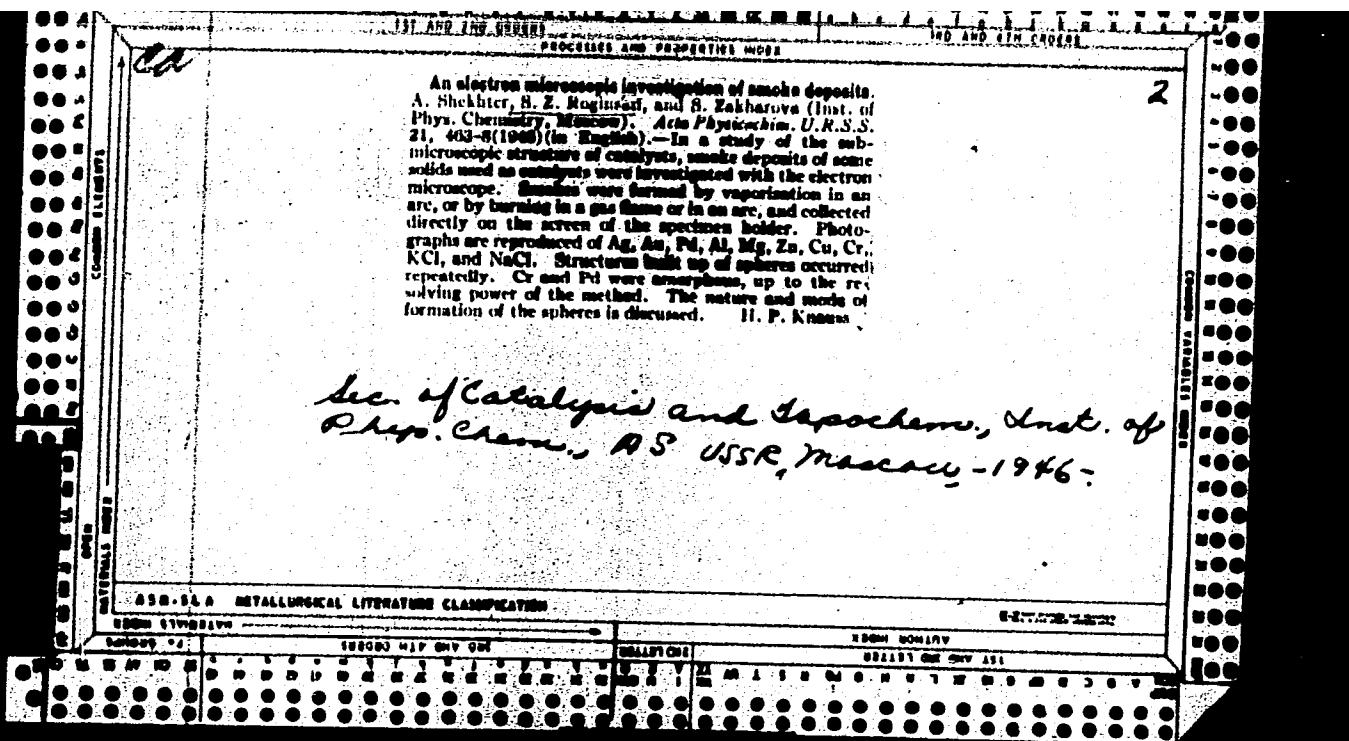
$c(x) = c_0$ , one has  $c_0(x) = c_0 e^{-kt}$ , in other words, the stationary concn. falls exponentially along the reaction tube. For a 2nd-order reaction,  $f(x) = c^2$ ,  $s = t^{(1/2)} - t^{(1/2)}$ ,  $c_0(x) = c_0/[1 + (c_0 B/s)]$ , and, at const. activity of the catalyst,  $c_0(x) = c_0/[1 + (tar/s)]$ , that is, the fall of the stationary concn. along the tube is hyperbolic. Generally, the higher the order of the reaction, the less drastic is the fall of  $c_0$ , or the longer is the zone over which the reaction extends. For the case of a Langmuir-type kinetic law,  $f(x) = c/[1 + (c_0 B/s)]$ , one finds the implicit equation  $c_0(x) = (c_0 B/s)(e^{-kt} - 1)/[e^{-kt} + B]$ , giving, for more distant portions of a sufficiently long reaction tube,  $c_0(x) = c_0 B^2 e^{-Bx}/B^2 - 1$ . Graphs of  $c_0(x)$ , at const.  $s$ , constructed by the above expression, show the fall of  $c_0$  along the tube, for a reaction governed by a Langmuir-type law, to be intermediate between the line corresponding to zero order (steepest fall) and the 1st-order curve. This type of kinetics holds for cases where adsorption on the catalyst surface is established practically instantaneously, and the chem. reaction is of the 1st order with respect to the surface concn. (3) Normally, the effect of the temp., in the case of a 1st-order reaction, finds its expression in the temp. dependence of a "natural scale of length"  $k = s/BN$  which has the meaning of the distance along which the concn. falls to 1/eth of its initial value. This dependence has the form  $k \sim e^{-J/RT}$  where the energy  $J$  may either be identical with the activation energy, or equal to the difference between it and the energy of adsorption, or else involve addnl. energy terms, and can be either pos. or neg. (4) The formal analogy between the change of the stationary concn. as a function of the distance in flow kinetics, and the change of concn. as a function of time in static kinetics, is evidenced by the formulation  $dc/d(s/x) = -2c/2s$ , the magnitude  $s/x = \tau$ , the time of contact, playing the same role as the time in static kinetics. In static kinetics, change of temp. changes the time scale; in flow kinetics it changes the space scale of the concn. distribution.

## 48M.1A METALLURGICAL LITERATURE CLASSIFICATION

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<p><i>Kinetics of catalytic reduction in a flow system. III. Dynamics of processes in the presence of catalyst poisons.</i> S. Z. Borodulin and O. M. Todes (Inst. Phys. Chem. S. Z. Borodulin and O. M. Todes (Inst. Phys. Chem. Acad. Sci. U.S.S.R., Moscow). Izv. Akad. Nauk SSSR, Otdel. Khim. Nauk 1946, 475-81; cf. Todes, ibid., No. 8, 629-8).—In the case of a poison carried by the gas stream and adsorbed on consecutive layers of the catalyst column (as distinct from uniform aging of the whole catalyst column, treated in Part II), the distribution of the poison concn. <math>b</math> in the frontal portion of the catalyst, limited by <math>x &lt; w</math>, is expressed by <math>b(x, t) = b_0 e^{-\alpha x/v}</math>, where <math>b_0</math> = poison concn. at the entrance of the reacted tube. On passing consecutive layers of the column, the rate of sorption of the poison falls continuously. After a sufficiently long time, the curves <math>b(x, t)</math> and <math>B(x, t)</math> (<math>B</math> = amt. of poison adsorbed per unit vol. of the catalyst), will shift along the tube without changing their shape. Substituting the variable <math>\xi = x - vt</math>, where <math>v</math> = velocity of propagation of the sorption wave; one finds <math>v = \alpha b_0/(B_0 + b_0) \approx \alpha b_0/B_0</math>, where <math>B_0</math> = amt. of poison adsorbed at <math>x = 0</math>. The fraction <math>x</math>, expressing the final fall of the initial activity <math>a</math> of the catalyst, falls with increasing <math>b_0</math> along a curve of the shape of a reversed desorption isotherm, or more steeply, depending on whether the activity decreases gradually with increasing coverage of the surface, or if the loss of activity occurs chiefly on sorption of the last portions of the poison. Designating by <math>N</math> and <math>N_0</math> resp., the no. of active centers at <math>x, t</math>, and at the outset (before poisoning), by <math>a</math> the no. of poison molecules necessary to inactivate one center, R. and T. show that <math>v = a/(1 + (\alpha N_0/b_0))</math>; the product <math>\alpha N_0</math> is termed the poison capacity of the catalyst. With increasing <math>b_0</math>, <math>v</math> increases, tending to the limit <math>v = u</math> at very high <math>b_0</math>. For a first-order reaction, the final expressions for the distribution of the concn. of the reactant are: at <math>0 &lt; x &lt; w</math>, <math>c(x, t) = c \exp(-x_0 x/v)</math>; at <math>w &lt; x &lt; u</math>, <math>c(x, t) = c \exp[-((u-x)/v) + ((t-(x/v))(1-x_0 \exp(u/v(u-v)))</math>], and, at <math>x &gt; u</math>, <math>c(x, t) = 0</math>. The head of the wave, with a low concn. of the reactant, moves along with the gas stream with the velocity <math>v</math>. The tail of the wave, where the concn. of the reactant has reached its final value, moves at the considerably lower velocity <math>v</math>. The width of the wave <math>= (u-v)/v</math> increases proportionally to the time. N. Then</p>																																																																																					
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COPPER ELEMENTS	OPEN	<p><b>Electron-microscopic investigation of anodic deposits.</b>  A. B. Shekhter, B. I. Ragnell, and S. V. Makharova (Inst. Phys. Chem., Acad. Sci. U.S.S.R., Moscow). <i>Bull. acad. sci. U.R.S.S., Class. sci. chim.</i> 1960, 401-5; <i>C.A.</i> 41, 6462a. — Pictures obtained with an RCA electron microscope, model 1940, resolving power a few tens of Å, are reproduced. Deposits were prepared by one of the 3 methods, (I) evaporation in a carbon arc, (II) evaporation in an arc between electrodes of the given material, (III) combination of the metal to oxide. Ag (method II) aerosols show both round and crystal forms and dendrites, particle size 100-2000 Å. Au (II), finest spheres, 100-1000 Å, by far the most frequent size 200 Å. This method is particularly monodisperse. Pd (or oxide?) (II), distinctly crystal, highly disperse, most frequent size 40 Å and less. Al (or <math>\text{Al}_2\text{O}_3</math>) (II), spherical, 100-2000 Å, mostly 1000 Å. <math>\text{MgO}</math> (III), conglomerates of cubes from 100 Å to 1 μ. <math>\text{ZnO}</math> (I, III) polydisperse, secondary needle-shaped forms. Cu oxide (II), preponderantly oval forms but often with linear contours, many fine particles of 100 Å. Cr oxide (I), polydisperse, amorphous. <math>\text{KCl}</math> (I), fine spherical particles mostly about 50 Å. <math>\text{NaCl}</math> (I), coarse round grains with saw-like contours, 1000-3000 Å, projecting teeth 300-500 Å. The spherical shapes represent, no doubt, unstable forms.</p> <p style="text-align: right;">N. Thon</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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ROGINSKIY, S.

USSR/Chemistry - Precipitates  
Chemistry - Microscopy, Electron

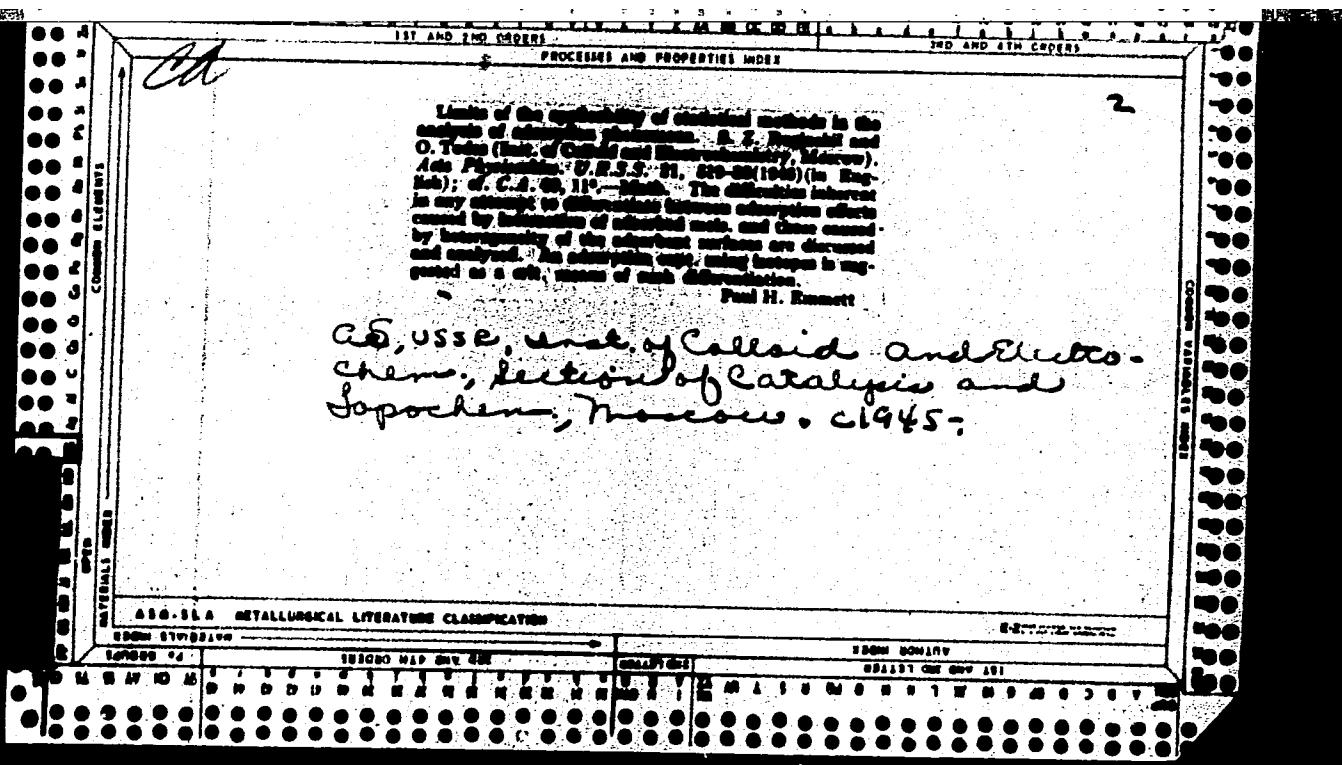
Sep/Oct 46

"An Electron Microscopic Investigation of Freshly-Formed Precipitates From Solutions,"  
A. Shekhter, S. Roginsky, Sec Catalysis, Inst Phys Chem, Acad Sci USSR, 7 pp

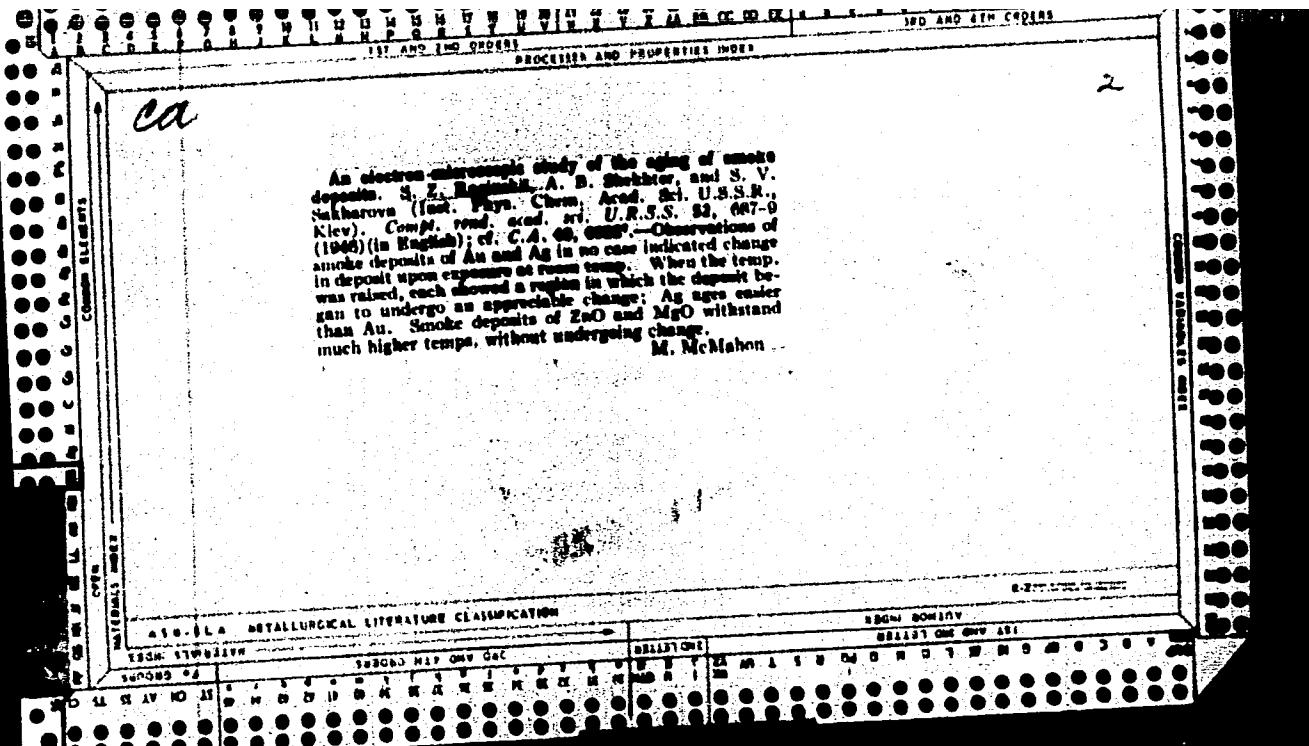
"Acta Physicochimica URSS" Vol XXI, № 5

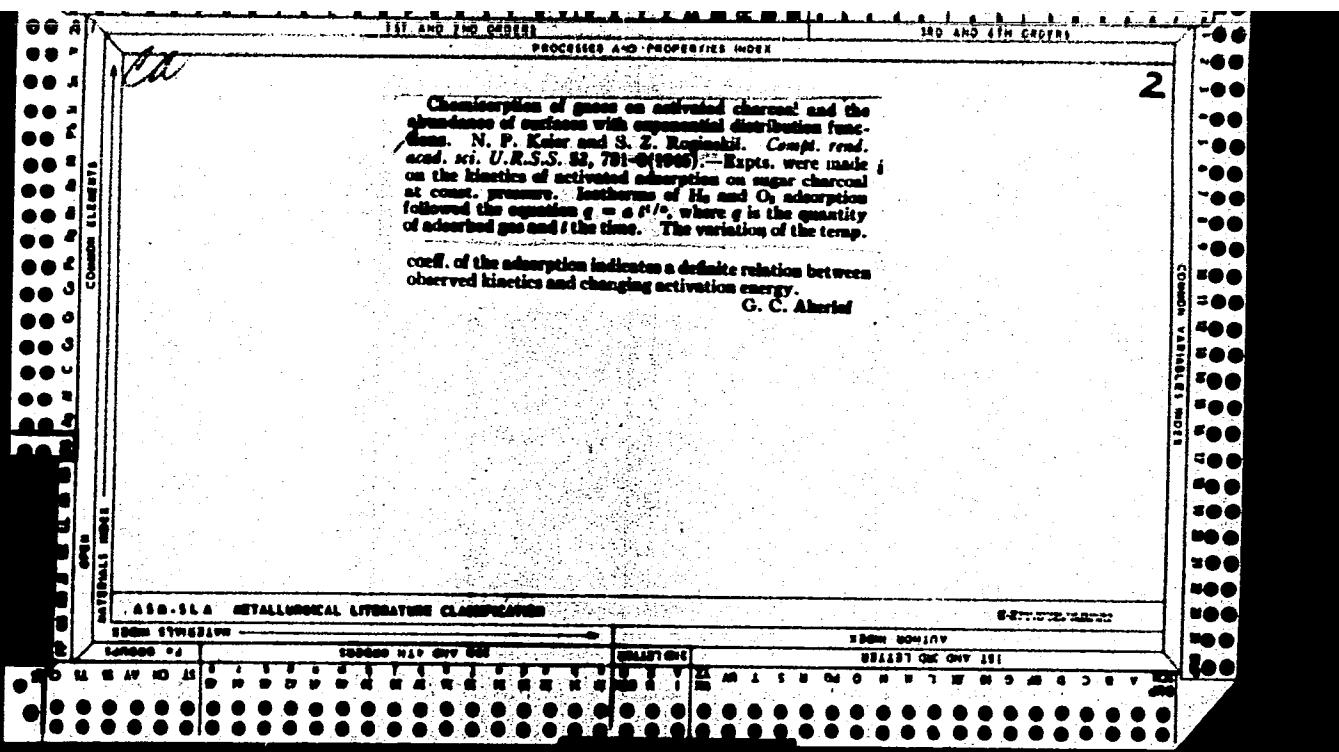
Submicroscopic structure study of freshly-formed precipitates of silver chloride, copper chromate, barium chromate, etc. with RCA type B microscope with a resolving power of several tens of angstroms. In all cases tested, photographs clearly show a predominance of rounded forms instead of the compound's natural crystalline form. Under more favorable conditions of crystallization the natural forms are assumed.  
Received, 15 Jan 1946.

PA 54T39

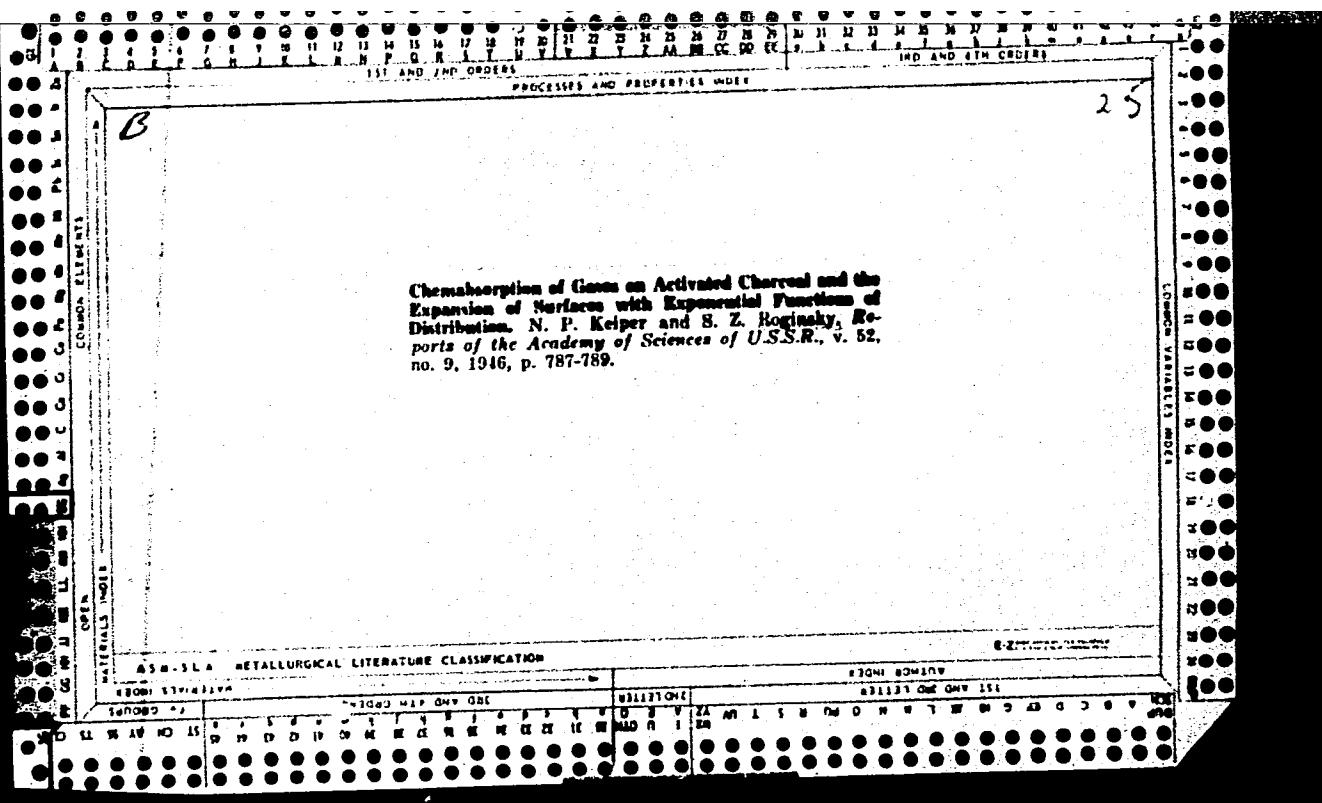


1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									
PROCESSES AND PROPERTIES INDEX																			
<p><i>CA</i></p> <p>The promotion of contacts by means of metal-organic compounds. G. M. Zhaiwrova, S. Z. Roginskii, and E. A. Fokina. Compt. rend. acad. sci. U.R.S.S. 52, 313-16 (1946) (in English); Survey Petroleum Literature No. 645, 3 pp. (Oct. 11-18, 1946); cf. C.I. 36, 320*.—A copper chromite catalyst, prep'd. by the pyrolysis of CuCrO<sub>4</sub>, and corresponding closely to the formula CuCr<sub>2</sub>O<sub>4</sub>, after removal of excess CuO with 10% CH<sub>3</sub>COOH, was treated with pure PbEt<sub>4</sub>. Its activity was investigated for the decompr. of H<sub>2</sub>O<sub>2</sub> (static system), the oxidation of H<sub>2</sub> (static system), and the oxidation of isooctane (dynamic system). The friable, porous, cryst. catalyst was soaked in solns. of PbEt<sub>4</sub> in hydrocarbons and heated in air; or the PbEt<sub>4</sub> was decompld. photochemically after standing; or a stream of air contg. PbEt<sub>4</sub> vapor was passed through a heated, mobile layer of catalyst, the last method yielding uniform promoter distribution. About 1% of the Pb used was taken up by the catalyst. The decompr. of 1.7 M H<sub>2</sub>O<sub>2</sub> reached a max. with about 3% PbO<sub>2</sub> in the catalyst. The kinetics over the promoted catalyst corresponded fairly well to a first-order reaction and were different from those for the un-promoted catalyst, whereas the activation energy (about 20,000 cal./mol.) changed comparatively little. The oxidation of H<sub>2</sub> was studied between 180 and 240°, found to be a first-order reaction, and reached max. activity with a promoter content of 0.03-0.08% PbO<sub>2</sub>. Three % PbO<sub>2</sub> poisoned the oxidation. The reaction rate was highly dependent on the mode of PbEt<sub>4</sub> introduction into the catalyst. The activation energy (about 17,000 cal./mol.) was unchanged. The effect of the promoter on the oxidation of isooctane was shown by an increase in the reaction rate, and by a change in the preexponential factor and in the activation energy which increased or decreased according to the mode of PbEt<sub>4</sub> introduction into the catalyst. Ernst M. Cohn</p>																			
ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION																			
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[Laws Underlyng the Selection of Catalysts for Complete Oxidation Of Organic Compounds,"  
Dok. An, 52, No. 5, 1946. Cor. Mbr. Acad. Sci. c 1946.



ROGINSKIY, S.Z.

"An Elecrron Microscopic Investigation of Smoke Deposits," Dok. AN, 54, No. 3, 1946.  
Mbr., Inst. Physical Chemistry, Sect. Catalysis and Topochemistry, Dept. Chem. Sci.,  
Academy of Sciences, -1946-

Investigation of the nonhomogeneity of the surface of coal carbon by the activated adsorption of hydrogen and oxygen. N. P. Kefel and S. Z. Roginskii. *Bull. acad. Akad. N.R.S.S., Classe sci. chim.* 1967, 571-583 (in Russian); *C.A.*, 61, 7190e. — Rates of adsorption on sugar C were detd. in a vol. of 240 cc.; the pressure was allowed to drop by not more than 5-7% of the initial pressure  $p_0$  whereupon new gas was admitted to restore  $p_0$  and so on; the C was evacuated with gradual heating up to 1000-1100°, kept at that temp. 1 hr., then 2 hrs. at 900°; the space between the two walls of the quartz vessel was evacuated constantly to prevent penetration of air through the hot quartz. Reproducibility of the rate measurements is demonstrated by the perfect coincidence of two curves for  $O_2$  at  $p_0 = 0.23$  mm. Hg, 204°, in 2 expts. sepd. by 17 intervening consecutive adsorptions of  $O_2$ ,  $H_2$ ,  $CO$ , and  $CO_2$ . Results are plotted in the form  $q$  (amt. adsorbed) against  $\log t$  (time in min.); graphic differentiation gives  $df/d\ln t \sim RT\rho(E)$ , where  $\rho(E)$  = distribution function of surface elements by activation energies  $E$ ; the plot of  $\rho(E)$  against  $\log t$ , tantamount to  $\rho(E)$  as a function of  $E$ , owing to the relation  $E \sim RT \ln t/r$ , shows  $\rho$  to increase rapidly with increasing  $\log t$  or  $E$ ;  $\log \rho$  is seen to be a linear function of  $\log t$  or of  $E$ , i.e.,  $\rho$  is an exponential function of  $E$ , of the form  $\rho(E) \sim e^{-E/kT}$ . The kinetic equation corresponding to this type of distribution is  $q = A t^{1/n}$  (*B.I.*, *C.A.*, 59, 5150) where  $1/n = \alpha RT$  and  $A = f(p_0)$ ; the exptl. plots of  $\log q$  against  $\log t$  for  $O_2$  at  $p_0 = 0.23$  mm. Hg, temp. 0, 100, and 204°, are actually seen to be linear, with  $1/n = 0.327 - 0.343$ , 0.447, and 0.810 - 0.870 at 0, 100, and 204°, resp., and the nonhomogeneity coeff.  $\alpha = \text{const.} \sim 0.6 \times 10^{-4}$  mol./cal. Plots of  $q$  against  $RT \ln t$  at const.  $p_0$  (0.23 mm. Hg) and different temps. confirm the rule of the const. shift  $\Delta$  along the  $RT \ln t$  axis (*M.I. Iu. ed.*): at initial  $q$ , between 0° and 200°,  $\Delta = 400$  cal./mol. At const. temp., 204-8°, the  $\log q$  against  $\log t$  lines at  $p_0 = 0.85$ , 2.72, and 6.25 mm. Hg are parallel, i.e., only  $A$  varies with  $p_0$ . The validity of the kinetic equation  $q = A t^{1/n}$  is thus demonstrated over a range of  $\log t$  of over 4 units. The equation holds equally well for the adsorption of  $H_2$ , with  $1/n = 0.39$ , 0.44, and 0.63 at 200, 420, and 540°, resp.,  $\alpha \sim 0.8 \times 10^{-4}$  mol./cal. The rule of const.  $\Delta R T \ln t$ , at const.  $p_0$  (2.2 mm. Hg), between 220 and 420° and between 420 and 540°, is fairly well confirmed; caleg.  $\tau$  from the exptl.  $\Delta$  by the relation  $\Delta R T \ln t = R(T_1 - T_2)\ln \tau$  (*Iuc. ed.*), and substituting it in  $R \sim RT \ln t/r$ , one finds the activation energies of adsorption of  $H_2$  as a function of  $q$ , which check satisfactorily with the values obtained by Arrhenius' equation. The plot of  $\log q$  against the temp. at const. time is linear; hence, the equation of the isotherm is  $q = q_0 e^{\mu/q}$ , that is, is of the same exponential form as the distribution function  $\rho(E)$ . As in the case of  $O_2$ , the  $\log q$  against  $\log t$  lines at const. temp. (204°) and various  $p_0$  (0.002, 2.11, and 5.56 mm. Hg) have the same slope. The rate of adsorption of  $O_2$  (at 208°,  $p_0 0.85$ ) after preliminary adsorption of  $H_2$  to the extent of  $3.35 \times 10^{19}$  mols.  $H_2$  remains unchanged, whereas preliminary adsorption of the same amt. of  $H_2$  would reduce the initial rate of subsequent adsorption of  $H_2$  to  $1/3$ ; only with  $7.05 \times 10^{19}$  mols.  $H_2$  adsorbed preliminarily does one observe some slowing down of subsequent adsorption of  $O_2$ , particularly in the initial stages, corresponding to the most active surface elements; at this stage, adsorption of  $O_2$  is slowed down 4.5 times, whereas under the same conditions, adsorption of  $H_2$  is slowed down 4670 times, i.e., is practically inhibited; evidently, at this coverage,  $H_2$  occupies also part of the surface elements active in adsorption of  $O_2$ . Conversely, preliminary adsorption of  $O_2$  to the extent of  $12.1 \times 10^{19}$

mol. lowers the rate of subsequent adsorption of  $H_2$  only in the initial stages, with the  $\log q$  against  $\log t$  lines merging eventually into one; the same coverage by  $O_2$  would completely inhibit subsequent adsorption of  $H_2$  itself. It indicates strongly the discreteness of points of adsorption for  $H_2$  and for  $O_2$ , and speaks against the representation of Langmuir (C.A. 36, 4222), especially as the coverage did not in any case exceed 1%. In the exponential distribution  $\rho(R) = H_2^{\alpha} e^{-H_2 R}$ , the constants  $H_2$  and  $\alpha$  have different values for  $H_2$  and for  $O_2$ ; only a small fraction of points of low activity for one gas coincide with points of high activity for the other gas. N. Thom

